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gentle Cathartic to carry off the purid
Matter which has been thrown on the
Intestines, afterwards the Patient should
immediately go under a Course of Affes
Milk and the Corn OIL with gentle
Exercise, especially Horse-Riding, and this
F E V E R S.

By Dr. S T E V E N S.



61299
Washington

L O N D O N,

Printed for R. BALDWIN, in Pater-Noster-Row

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P R E F A C E.

WHEN any Person would aspire to be acquainted with the wonderful Works of Nature, he must begin with giving an unwearied Attendance upon all her Operations and Motions; he should constantly attach himself to observe all the Phænomena from thence arising, till he has collected together such a Number of Observations, as will give him a clear Insight into the Nature and Cause of these Operations and Motions, and from thence he will be able to establish the general Laws of Matter and Motion.

From the Knowledge of these Laws it is that Medicine, and, in short, all other Arts may be brought to their wished-for Perfection, i.e. as far as human Nature is capable of bringing them, the true Causes of Diseases discovered, and the exact Method of relieving those Diseases according to their Causes. But Studies of this Kind have been very much neglected in all the Sciences, but more particularly in Medicine; and Physicians have betaken themselves to Studies of a different Nature, to discover the Causes of Diseases and the Operation of Medicines; some follow-

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ing the ridiculous *Whims* of Aristotle, others those of Paracellus, Van Helmont, and others of that Tribe; many again have attributed the Causes of Diseases, and the Operation of Medicines, to some specific or occult Quality contained within them; and some others have, from Chemical Principles, endeavoured to support their Hypothesis; nay, there are various other hypothetic *Whims* which Physicians have introduced into Medicine to account for the Nature and Causes of Diseases, and which are too tedious to be inserted here; all which, though they bear no Resemblance to Truth, yet, as they are writ by Men of Character, and those of no small Share of Rhetoric, their Manner of Writing, and Ideas, were imbibed by some of the unthinking Part of Mankind, to the no small Detriment of this most noble Art; as their Structure was built upon a sandy Foundation, and consequently subject to the smallest Storm. On the contrary, if they had, previous to their Study of the Practice of Medicine, studied,

First, The Laws of Matter and Motion.

Secondly, The Make, Structure, and Composition of the human Body.

Thirdly, The Method of applying these Laws to the Body, the most finished Fabric upon

P R E F A C E.

upon Earth, and thereby to discover how each Part and Fibre of the same is set in Action, continued and regulated therein, and what Causes are sufficient to weaken or retard the same, they would have built their Structure upon a solid Foundation, a Foundation upon which a Structure might be built so as to bring Medicine to its wished for Perfection.

It is an Observation of the great Boyle's, and I think a very just one, that if a Physician cannot account how Heat and Cold, Fluidity and Solidity, Fermentation, Putrefaction, Viscosity, Coagulation, Dissolution, &c. are generated and destroyed in Bodies, it will be impossible for him to find out the Causes of Diseases; as they all depend upon the Change of these or the like Qualities. And on the contrary, when a Physician is acquainted with these Laws of Matter and Motion, and the different Ways whereby they may produce their Effects, he therefore is able to account for the Operations of Nature, the Causes and Effects of Diseases, and to point out the Means whereby they may be relieved. Whereas, on the other Hand, when a Physician is unacquainted with the Causes of Diseases, he cannot possibly exhibit proper Remedies always (although the Medicine may sometimes have its desired Effect, by

mere Chance) and the poor Patient must suffer through the Physician's Ignorance.

There is another Observation of the great Boyle, and certainly equally true with the former, that the many Deficiencies in the Reasoning of Philosophers, arise from their having too precipitately, and without a sufficient Number of Experiments, presumed to deliver Axioms, and establish general Rules. For it is certain that a Theory, which is founded upon only a superficial Enquiry into the Operations of Nature, must be entirely overthrown when a more solid Enquiry is made.

As we have already observed, that, to understand rightly the Laws of Matter and Motion, is the only Means by which a thorough Knowledge of the Operations of Nature can be obtained, we shall next observe that there are several Phænomena, which are the Effects of these, that will be very necessary to be understood by all Practitioners of Medicine, as these prove to an ocular Demonstration the Effects of those Laws.

The first of these are the Mechanic Powers : And certainly every Physician should be acquainted with these, before he can pretend to discover the Structure of an Animal Body, the Motion of the Muscles, and to give a rational Account of the Weight they are capable of raising, or is equivalent to the Force they exert.

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PREFACE.

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The second of these is the *Doctrin* of *Hydrostatics* and *Hydraulics*; for by these are all the *Laws* and *Motions* of the *Animal Fluids* understood; as the increased or decreased *Velocity* of the *Circulation*, and its *Velocity* in the different *Series* of *Vessels* through which it is received; the *Contents* of the *Arteries* running through a decreasing *Series* of *Vessels*, and the *Contents* of the *Veins* through an increasing *Series*, with the curious *Apparatus* of *Animal Secretion*: without the *Knowledge* of which, a *Physician* must be entirely ignorant of the most curious and useful *Phænomena*.

The third of these is *Chemistry*; which, according to the learned *Boerhaave*, is the only *Means* by which *speculative Philosophy* is rendered *practical*, and which the great *Bacon* says is *Philosophy in Action*, as it proves to *ocular Demonstration*, the different *Effects* of *Rarefaction*, *Fermentation*, *Dissolution*, *Concretion*, *Sublimation*, *Crystallization*, *Precipitation*, and most of the *Phænomena* of *Nature*. By this we discover the *Nature* and *constituent Parts* of all *Bodies* or *Masses* of *Matter*; by this we may discover the *Nature* of the *Particles* which compose the *solid* or *fluid Parts* of our *Bodies*, the different *Degrees* of *attractive Force* with which they are connected together, and the different *Degrees*

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P R E F A C E.

degrees of Heat or Motion which will increase or decrease their attractive Force, and the Effects which will be produced thereby.

The fourth of these is Pharmacy, to which we may add Botany; and these are what no good Practitioner of Medicine should be ignorant of; for the Knowledge of Vegetables, and the Knowledge of rightly preparing, and understanding the Goodness of Medicines, are Things so essential to the Practice of Physick, that those who are ignorant of the same should rather be called Mountebanks than Physicians.

After a Physician is acquainted with the Laws of Matter and Motion, and those Phaenomena we have just now mentioned; his next Study should be to make Observations upon the Effects of the Diseases of the human Body; and the Means by which Nature, unassisted, gets the better of her Ail; and what Efforts she makes to relieve herself. And by a Number of such Observations, and the Application of these Laws to them, he cannot fail of finding out the true Cause of those Effects, and the Method of relieving them, and of being a happy, safe, and unnerring Practitioner.

But when any Person, who would study Physick, neglects the Method we have proposed, and pursues his Study by heaping together

gether a great Number of Medicines for all Diseases, which he thinks shall operate by their specific, or occult Quality, such a Person (we shall not call him a Physician) although ever so regularly bred, soon becomes a Dishonour to the Practice of Medicine.

But let me tell those Favourers of Specifics, and Medicines which operate by an occult Quality, that there never did, nor ever can, exist any such Thing, as Nature now stands constituted.

I am very certain that this Doctrine of specific and occult Qualities has covered more Ignorance, and recommended more Fools, than any one Thing in the World besides; especially if we add to it the Term malignant.

Thus having pointed out the Qualifications of a Physician, and the Qualifications of a specific Doctor, or an Empiric; we shall now proceed to inform the judicious Reader of the Contents of the following Work.

And First, We have pointed out the general Laws of Matter and Motion, as we have been able to trace them, both from Experiments, and the Observations of the greatest Naturalists of all Ages.

Secondly, We have applied these Laws to the animal Body, and by them have endeavoured, to account for the various Operations of Nature, to point out the true Causes of the Diseases

eases we have treated of, to lay down the Method of relieving them, and to account for the Operations of the Medicines by which they are relieved.

This we have endeavoured to do in the plainest Manner possible, carefully avoiding all the absurd Notions we have before taken Notice of, and instituting in their Room a Practice which is founded upon just Principles and Observations.

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A TREA-

THE INTRODUCTION.

I AM very well apprized of the Danger I run, in venturing to write upon this Subject, when so many eminent Men of the Profession have already undertaken it. But the Reason I shall offer in my Defence, is, the little Satisfaction I could meet with from any of their Performances.

I CANNOT be apprehensive of giving a Dis taste to any Person, in taking the Freedom, unbiass'd by Favour or Prejudice, to inform the World how it comes about, that Medicine has baffled the painful and ela-

borate Enquiries of the most eminent Practitioners, from the great *Hippocrates* down to our present Time; and by what Means it is to be raised to its wished for Perfection, so far as the Life of the human Species is capable of being preserved by Art.

WHEN those who profess Physic and Philosophy, or indeed any other Kind of Learning, would be esteemed Omniscient, tho' they know not the true Causes of the Phænomena they have treated on, they generally have Recourse to hard Terms, which they substitute as expressive of Causes they would have us believe they understand; tho' in truth they understand them no more than those on whom they would impose them: And hence arises a mere wordy Science, which can only be regarded as the Asylum of Pride and Ignorance.

AND

AND thus we have been imposed on by the Ignorance and Impudence of those, who would make us believe Darkness is Light, Bitter is Sweet, and Folly Wisdom; and all this to obtain a little of the Reverence, Admiration, and Wealth, of this transitory World. And therefore such Men take it ill to be pressed for a clear Definition, or Explanation of such Terms; and are angry unless we can be content with an Explanation of obscure Terms, by others equally dark and obscure.

FROM hence arose the plentiful Stock of Railing that we find in such Authors, who are pressed to give us clear Ideas and suitable Explications of such favourite Terms; especially when such have laid up, or hope to acquire, a considerable Share of Reputation or Profit, upon such baseless Foundations. Hence we hear so much of different Opinions, and abundant Railing

among Physicians, Philosophers, and Professors of every Kind of Science. And thus they have gone on deceiving themselves, and others who are their Followers. This Passion, this Blindness, for the Honour of great Names, and not judging for ourselves is preposterous, and none of the least among the Causes of that Darkness and Obscurity, which, at this Day, attend medicinal Enquiries.

To speak freely then, it appears to me, that the medicinal Art is of greater Antiquity than the Study of Philosophy; because when the human Species first began to use Medicine or Philosophy, as they were determined by their Regards either to the Body or Mind; the Reasons for the former they found perpetual, but for the latter only fortuitous and accidental: For they who in the beginning inhabited the Earth, lived first on Vegetables, exposed

posed to the Irregularities of the Atmosphere ; that is, they ailed before they provided themselves with proper Materials to guard against those Irregularities ; as Houses and Cloathing : Those were the first Grievances they found, and these their first Remedies. But when these Remedies proved ineffectual to relieve their Grievances, they were under a Necessity to have Recourse to the Art of Physic ; and whosoever found out Relief for them, were accounted Benefactors to the Community. But Men began not to use Philosophy, till they had experienced the Operations of Remedies, and made an effectual Search into the Nature of Things.

BUT in those Days Men attributed their Diseases to the Anger of the Gods ; and Astronomy being the first Science that was cultivated by those who professed Philosophy, as the Names of the Gods were

in those Ages affixed to particular Stars ; therefore, it is very probable, that the first Physicians began their Enquiries into those Diseases which attended upon the Alterations of Seasons, and the Motions of the Sun, Moon, and Stars, which the greatest Part of the World in those Days looked on as their Gods, and on whom all sublunary Beings depended. Hence arose that confused Heap of Nonsense called Judicial Astrology, which in former Ages was thought to be the noblest Science that was cultivated amongst Men, and kept the thinking Part of Mankind from searching into the true Laws of natural Bodies, Medicine, &c. because they thought all these were governed by the Influence of the heavenly Bodies, and to study their Motions and Aspects was all that Man was capable of doing. From this Sprung the Doctrine of occult Qualities, Sympathies, Antipathies, malignant Diseases, specific Medi-

Medicines, &c. and I am sorry to add, that a great deal of such empty Notions are countenanced by Men of Learning to this Day. These, with the Jargon of *Aristotle*, the Nonsense of *Paracelsus* and *Van Helmont*, and our School-Bigotry, have hitherto greatly contributed to prevent Men of Genius from discovering the true Causes of Diseases, and the Effects of Medicines.

ALL the World will allow, that it is not just to deliver any thing as a Truth, either in the Theory or Practice of Medicine, concerning which we are more uncertain than any Man would choose to be in a Point of Consequence relating to his ordinary Affairs: For the Care of our Bodies ought to exceed that of our Estates. Hence it follows, that it is not just to advance any thing in the Theory or Practice of Medicine, but what is founded upon the genuine Laws of Matter and Motion, which

are the Laws by which all material Bodies are governed, and by which the Practice of Medicine may be brought to its greatest Perfection. From whence we may justly conclude, that these Notions of occult Qualities, malignant Diseases, specific Medicines, &c. delivered down to us by some of the Antients, and the Nonsense, Pride, and Bigotry of the Moderns, are the true Reasons that Medicine has baffled the painful and elaborate Enquiries of some of the greatest Practitioners to this Day.

It is much to be wished our Forefathers in Medicine had confined their Practice to Bleeding, giving a common Purge, and diluting, rather than have grafted a Science upon Conjecture and erroneous Opinions, which are as opposite to Truth as the East is from the West. By this their Nonsense it is, that all their Descendants have been groveling in a State of Darkness and Obscurity,

scurity, and that Medicine falls short of its wished for Perfection ; and that long since it has stood condemned to Uncertainty, by those who do not consider that its Errors are not in the Art, but in its Professors : For after many had been wearied out with those Disputes, which this absurd System had for a long Course of Time stirred up, and had found the Evil increase rather than admit of any Remedy, by a common Defection of Practitioners into the current System of Errors, they were easily induced to throw off all Regard to Persons so much involved in Uncertainty and Contradiction. And this is what has rendered this Art unimproved for many Ages : This is the Stumbling-block which we should be very careful to avoid, in order to judge rightly of the Operations of Nature, and if we would shun the Imputation of being Slaves to Opinion.

CERTAINLY it does not suit that Art, which alone presides over the Health of the human Species, to be encumbered with the Conjectures, and baseless Notions of Disputants ; for no Man of common Sense would commit the Care of his Life to one, who administered Medicines and did not know the Manner of their Operation, but imputed it to some occult or specific Quality. But it behoves every good Physician to cast off all this Jargon and groundless System, and to study Nature according to her genuine Laws, by which his Structure will be laid on a solid Foundation ; and whatever he builds will stand the Test of future Ages, and the Darts of Ignorance will not prevail against it.

WHOSOEVER considers with an unprejudiced Mind what we have already said, will allow, that nothing ought to be advanced into a Principle in Medicine, which
is

is not upon an equal Certainty with the Objects of Sensation: As Certainty is of the last Consequence in a Science which is by no means a Matter of Curiosity, but on the contrary affects the Health and Life of the human Species.

THE State of Darknefs and Obscurity that Medicine was in, in former Ages, may be some Excuse for their ill Success; but what Excuse the present Age can have I know not; for I find but very little Improvement therein more than our Predecessors could boast of, notwithstanding so many additional Assistances from Botany, Anatomy, Chymistry, and, above all, the Knowledge of the genuine Laws of Nature, upon which all our Structures ought to be built.

I HAVE often admired and wondered, that so many learned and ingenious Men,

as

as they thought themselves, could not point out that Block upon which all have stumbled, destroy that Structure which is built upon a sandy Foundation, and lay a Foundation for a Structure, which shall endure till Time shall be no more. Indeed some of our modern Physicians have rejected the Notion of occult Qualities and the astral Influences; but they have still retained the Notion that all the Medicines, which they find effectual in removing any Disease incident to human Bodies, have specific Qualities, and all the Diseases they are not acquainted with, they call Malignant; and many more such ridiculous Notions.

It remains, therefore, that we reject all those Notions with Contempt, and found the System, that we shall advance, upon the genuine Laws of Matter and Motion,

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Motion, by which all Nature is known to be governed, and which Experience teaches us is the only Means of laying a solid Foundation to build upon.



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(13)

Notion by which all Nature is known to
be governed, and which Experience
teaches us is the only Means of laying a
solid Foundation to build upon.



A P R A C

PRACTICAL TREATISE

**ON
F E V E R S.**

CHAP. I.

*Containing the General Laws of
Matter and Motion.*

PROP. I.

*All Bodies continue in their State of Rest, or
Motion uniformly in a tangent Line, ex-
cepting they are obliged to change that State
of Rest, or Motion, by Forces impress'd.*

WE see all Bodies, by their Nature,
are inactive and incapable of
moving themselves; wherefore, unless they
be

be moved by a Force superior to their repelling Force, they must necessarily remain for ever at Rest. This may be proved by daily Experience; for when any Body is set in Motion, it continues to move in the same Direction, and with the same Velocity; until the Power of its own Gravity, the Resistance of the Air, the Figure of the Body, or some other external Cause, determines it from its tangent-line Direction, decreases its Velocity, and at last brings it to a State of Rest: But in a perfect Vacuum there is nothing of this Kind, therefore, in a Vacuum, Motion must of Necessity be perpetual.

P R O P.

P R O P. II.

All Change of Motion is in proportion to the Power of the moving Force impressed; and is always made according to the same Direction in which that Force is impressed.

FROM whence we may observe, that if any Power produceth any Quantity of Motion; another Power which is double, treble, &c. will produce a double, treble, &c. Quantity of Motion; whether it be impressed together or at different Times: And this Motion is added to the Motion of a Body in the same Direction by Impact, and it will move so much the quicker in Proportion to its Quantity; but it is subtracted from the Motion of a Body in contrary Direction, and therefore that Body will move so much the slower. It is also obliquely joined to the Motion of a

C

Body

Body obliquely moving; and will be compounded with it according to the Determination of both. From whence we may plainly observe, that, as Nature now stands constituted, there can be no such Thing as perpetual Motion; for, according to our Proposition, the Motion produced is but proportional to the generating Force, and all Motions on our Globe being performed in a resisting Medium, *viz.* the Atmosphere, a considerable Quantity of the Motion must, in the Communication, be spent on this Medium; and consequently the same Quantity cannot return undiminished upon the first Mover, which is absolutely necessary for a perpetual Motion.

PROP.

P R O P. III.

The Repulse, or Re-action, of two Bodies is always equal, and in contrary Direction, to Impulse, or Action, i. e. the Action of two Bodies is always equal in contrary Directions.

IF we press any heavy Body downward with our Feet, that heavy Body equally presses our Feet again upward: Or if a Stone falls toward the Earth, it attracts the Earth as much as the Earth attracts it, in Proportion to the Quantity of Matter in each: The Steel draws the Magnet as much as the Magnet draws the Steel; as is evident by making both swim in Water. And when a human Body is in perfect Health, the Fluids repulse the Solids equally as the Solids do the Fluids.

P R O P. IV.

The Quantities of Motion, in all moving Bodies, are, as the Quantities of Matter and Velocities conjunctly.

FOR if the Velocities are equal, 'tis manifest that the Quantities of Motion will be as the Quantities of Matter; and if the Quantities of Matter are equal, the Motions will be as the Velocities: Therefore the Quantities of Motion must be in the Compound Ratio of both, or as the Quantities of Velocities multiplied into the Quantities of Matter.

P R O P.

P R O P. V.

In all moving Bodies, the Spaces described by their Motions, are as the Velocities multiplied into the Times of their Description.

FOR the Velocities being equal, the Spaces described by their Motions must be as the Times ; and the Times being equal, the Spaces are as the Velocities : Therefore the Spaces described will be in the Ratio compounded of the Times and Velocities.

P R O P. VI.

If a Body be continually forced or impelled by any given Power, acting upon it incessantly and without Intermission, the Motion of that Body, thence arising, will be uniformly accelerated; in which the Velocities will be ever as the Times, and the Spaces described as the Squares of the respective Velocities.

A BODY being put in Motion, by the Impulse of a superior Body, will, removing all external Resistances, continue to move on in a tangent Line, with a uniform Velocity in Proportion to, and in the same given Direction with, the impressed Force, as by Proposition the second. But when Motion is produced, not by one single Impulse, but by continued Impulses of an equal Force without Intermission, the

the Quantities of Motion will be as the Times; that is, double in a double treble in a treble Time, &c. and the Velocities thence arising, will be proportional thereto, by the same Proposition. And consequently, the Velocities will be equally and uniformly accelerated in Proportion to the Times: But the Spaces described, are always in a compound Ratio of the Times and Velocities, as by Proposition the fifth. And therefore, when the Ratio of the Times and Velocities, is the same, the compound Ratio of the Times and Velocities will be the same with the Squares of the Times, or the Squares of the Velocities respectively: Which is the Thing we wanted to prove.

P R O P. VII.

All Bodies whatever, even to the most minute Atom, have an attractive Force.

ATTRACTION is, by the modern Students in Philosophy, considered two-fold, *viz.*

I. ATTRACTION of Gravitation, whereby one Body attracts another at a Distance, and causes it to gravitate towards itself; therefore since Action and Re-action are always equal and directly contrary to each other, if any Body attracts another, it is also as much attracted by the other Body. Therefore from hence we may conclude, that if two Bodies do mutually attract or gravitate towards each other, by Forces proportionable to their Distances, they will describe both about the common Center of Gravity, and about each other *concentrical*

cal ellipses; and, *vice versa*, if any Body does describe such Figures, their gravitating or attracting Forces are proportional to their distances. And if they attract each other with Forces proportional to the Squares of their Distances, they will describe both about the common Centre of Gravity, and also about each other, conick Sections having their umbilici in the Centre about which the Figures are described; and *vice versa*. It may be demonstrated also, that any Particle of Matter within the Superficies of any Sphere or Globe is attracted, or gravitates by a Force proportional to its Distance from the Centre; but without the Surface of the Sphere, by a Force proportional to the Square of its Distance from the Centre.

2. ATTRACTION of Cohesion, which we find only among the very small Particles

cles of Matter in Bodies, and of which we shall treat of under the next Proposition.

P R O P. VIII.

The Quantity, or Force of Attraction in all Bodies is always proportional to the Quantity of Matter in the attracting Body, as being in Reality nothing but the Result or Sum of the united Forces of all those single Particles of which it is composed: And from hence we shall enumerate its chief Properties.

1. THIS Force is then the greatest, when the Particles are in Contact, or touch each other.

2. IN homogeneous Particles, the greater the Surface of Contact, the stronger the Force.

3. THE Sphere of this Attraction is greater or lesser, in Proportion to the Quantity of

of Matter in the Particle; as is likewise its Force.

4. CONSEQUENTLY the densest Particle, whose Surface of Contact is largest, hath the greatest Attraction of Cohesion,

5. THIS Force decreases nearly as the Cubes of the Distances increase; and not as the Squares thereof, as in the other Sort of Attraction.

6. IN Particles of the same Kind, or equal Density, the Attraction is stronger between small Particles, than the large; because in those there is a greater Surface than in the these; especially if they are of a spherical Form.

7. AT equal Distances from the Centre of homogeneous Spheres, it will be in Proportion to their Magnitudes.

SCHOLIUM.

S C H O L I U M.

THE attractive Force exerts itself only where the Tendency of a Particle another Way is overpowered by its Proximity to that in whose Contact it is supposed to be drawn: For this Property is universal, and every Part of Matter, does draw, and is drawn by every other Part of Matter, within one another's Sphere of Attraction; so one cannot influence another at any Distance, but must necessarily be very near it; and so much the nearer, in Proportion to its Smallness: So that upon a double Account, two Particles cannot influence one another by their Attractions, unless very near; one from their predominant Inclinations another Way, and the other from the Minuteness of their Spheres of Attraction; insomuch that out of that Reach, they are within their Sphere of Repulsion,

fion, and consequently can never come together.

P R O P. IX.

If Particles swimming in a Fluid attract one another more strongly than they do the Particles of the Fluid, the Force by which they come together, will be as the Express of their mutual Attractions, to their Attractions of the Fluid.

SUCH Parts of the Fluid as interpose between the attracting Particles will be pressed upon by such their Inclinations to each other; and therefore, according to the Nature of Fluidity, the Parts of the Fluid will be driven out of their Places, by such Excess of Pressure, whereby the attracting Particles will join.

SCHOLIUM.

S C H O L I U M.

IF two Globules of Blood get within each other's Sphere of Attraction, they will force the serous Parts out of their Places by their Excess of Pressure, and consequently will be brought into close Contact one with another : which gives Rise to the Viscidity and Cohesions of the human Blood, when it has not a proper Degree of Motion from the Solids, to keep its Globules from falling into each other's Sphere of Attraction and Cohesion.

P R O P.

P R O P. X.

If Particles swimming in a Fluid are more attracted by the Fluid than by one another, they will recede from each other with a Force that will be equal to the Difference of their mutual Attractions, and the Attraction of the Fluid.

FOR the ambient Particles of the Fluid attracting them more strongly than they do each other, they will by such Excess of Force be drawn from one another into Contact and Cohesion with the Particles of the Fluid.

S C H O L I U M.

WHEN the Serum of human Blood attracts its Globules with a greater Force than they attract each other, *i. e.* when

the Serum is replete with such Substances or Particles of Matter as are angular, [as saline Particles,] and consequently have larger Surfaces than the Globules, which are spherical, their Attraction on the Globules will be greater than the Attraction of the Globules upon each other; from whence proceeds a Diffolution of the globulous Part or Crassamentum of the Blood; which is followed by a Train of putrid Diseases; by some of the Sons of *Æsculapius* called malignant; but for what Reason I know not.

P. O. P.

P R O P. XI.

The Force, by which Particles, attracting one another, cohere, is, Cæteris paribus, in Proportion to their Contacts.

FOR these Parts not in Contact, conduce nothing, or extremely little, to the Force of Cohesion; and a much greater Power is required to separate two Particles which cohere in two Points, than two Particles which cohere only in one Point: For which Reason it is, that we find two Pieces of polished Marble adhere more strongly than any other two Bodies of equal Dimensions, which are not so solid, but have more Pores and Interstices between their Parts, and which will not receive so good a Polish, by which their Parts are brought into so close a Contact with one another. And for the very same Reason

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son it is, that many Bodies which have the least specific Gravity have very often the strongest Cohesion and Tenacity; for that whereby Particles of the least Matter in Proportion to their Surfaces are specifically lightest, also occasions their strongest Cohesions, by being capable of more Contact than Particles of more Solidity under less Surface.

COROLLARY I.

THIS Power of Attraction, or Cohesion, in the small Particles of Matter, increases, as the Bulk and Weight of the Particles decrease. For since this Power acts only within the Sphere of Contact, 'tis very evident that the Quantity of this Power or Force must be according to the Largeness of this Sphere, that is, according to the Largeness of the Surfaces of the Particles, and their Density. For the Surfaces of all
Bodies.

Bodies in Proportion to their Solidities, are as their Diameters, inverſly: For the Surfaces increaſe or decreaſe as the Squares of the Diameters, but the Solidities as their Cubes. And of Courſe the moſt minute Particles muſt have the largeſt Surfaces, in Proportion to their Solidities, and likewise be capable of touching other Particles in more Points, or have greater Spheres of Contact, and certainly have the greateſt attractive Force in Proportion to their Weight. And hereby this Power of Attraction in the ſmall Particles of Matter, being increaſed as their Bulk and Weight are decreaſed, ſuch ſmall Particles will be capable of receiving any given Direction by this Power of Attraction, juſt after the ſame Manner as if they had no ſpecific Gravity at all.

COROLLARY II.

THIS Power of Attraction or Cohesion in all Bodies will be ever proportional to the Quantity of Contact in the immediately contiguous Particles: and upon this depends the various Degrees of Cohesion in all Bodies.

COROLLARY III.

FROM this Power of Attraction, or Cohesion, of the most minute contiguous Parts of Matter, all the Phenomena of elastic Bodies may be explained. For where the minute contiguous Parts of any Body, which unite and strongly cohere by immediate Contact, are, by a Force superior to their Force of Contact, impelled or driven from their Points of Contact to some small Distance; after this superior Force is taken off, their own attractive Force will again take

take Place, and the divided Particles return to their prior Contact; by which Means the Body will re-assume its pristine Figure. But when by any such superior Force, the minute contiguous Parts are separated, or forced beyond their Spheres of Attraction, they will not only remain in a State of Disjunction, and be incapable of returning to their former Contact, but will repulse each other, as they are now in their Sphere of Repulsion: By which the Springiness or Elasticity of such a Body will be entirely lost and destroyed.

SCHOLIUM.

FROM hence we may judge of the Physical Cause of the Relaxation and Contraction of animal Fibres. When the Body is in Health, and a due Equilibrium between the Solids and Fluids, the Pressure

of the Fluids is such as keeps the attractive Particles of the Fibres from adhering too strongly together, growing hard and callous, and the minute Tubes to their proper Diameters. When the Pressure of the Fluids increase, a Force, or Power, will be laid upon the Fibres superior to their Force or Power, of Cohesion; and consequently the Particles of Matter with which they are composed, are forced or driven from their Points of Contact, to Distances in Proportion to the greater or lesser Pressure of the Fluids, whereby the Fibres are greatly weakned and relaxed. When this Load is not so great as to force or drive the Particles of Matter which compose the Fibres beyond their Spheres of Attraction, and is very soon removed, the Particles will return to their former Contact, and the Fibres to their former Elasticity and Contraction. But when
this

this Load or Pressure of the Fluids drive the Particles which compose the Fibres, beyond their Spheres of Attraction, or is not timely removed, the Particles will remain in a State of Disjunction, and be incapable of recovering the former Position and Contact; and the Spring or elastic Force of the Fibres will be weakned, broken, or entirely lost. Again,---If the Pressure of the Fluids is weakened, either by decreasing their Quantity, or Motion, so that their Force upon the Solids is not so great as is the attractive Force of the Particles which compose the solid Parts; this attractive Force will continue to increase, and the Particles to adhere more strongly together, 'till at last the Fibres become hard and callous, (this is generally the Case of aged Persons) the minute Tubes to lose their natural Diameters, and at last these Tubes turn into a hard, callous Substance.

P R O P;

P R O P. XII.

If the attracting Particles are elastic, they must necessarily produce an intestine Motion, greater or less, according to the Degrees of their Elasticity and attractive Forces.

BECAUSE upon the Occursions which their attractive Powers draw them into, they will fly off from one another again with the same Degree of Velocity that they meet together, allowing for the Resistance of the Medium; but when they approach other Particles in their Refilition, their Velocity must increase, because they are afresh attracted: And therefore meeting a second Time, they will recede with a greater Velocity than they did at their first Concurfion; which will continue an intestine

tine Motion, as are their attractive Powers and Elasticities.

P R O P. XIII.

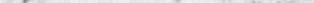
All Bodies are capable of being divided ad Infinitum, or without End; and there is no Part of any one Body, or no Portion of Matter so small, but that a Part of another Body may be exactly as small.

THE Divisibility of Matter is that universal Property or Disposition of a Body, whereby it is capable of being divided or reduced into Parts, either actually or mentally, *ad Infinitum*, or without End. This is that Property by which the Particles of Matter in all Bodies are capable of a Resolution or Dissolution into their constituent Particles, as in many Operations of Chymistry. Tho' we have no Possibility of an Instance of this infinite Divisibility of Matter,

Matter, yet Nature proceeds towards it to inconceivable Lengths, in many of her stupendous Operations. The following Instances will give us some little Insight into the Divisibility of Matter. It has been computed, by a very great Mathematician and Philosopher, that in a Second of Time there flies out of a burning Candle the following Number of Particles of Light, 418,660,000,000,000,000,000,000,000,000,000,000,000,000, which is 10,000,000,000, or Ten Millions of Millions a bigger Number than 100,000,000,000,000,000,000,000,000,000,000, the Number of the Grains of Sand, computed to be in the whole Earth; and if so many Particles of Light flies out of a Candle in a Second of Time, what an infinite Number must fly off from that Candle during the whole Time of its Burning: If the Orbit of Saturn, which is calculated

to be 777,000,000 of Miles Semi-diameter, was full of Grains of Sand, it would not be equal to the number of minute Particles that a burning Candle may be divided into.

AGAIN, our ingenious Countryman, Dr. KEILL hath computed the Magnitude of a Particle of *Affœfætida*, to be


Parts of a Cubic Inch.

He has likewise proved that one of those Globules of Blood, which circulate in the Arteries of some minute Animals, doth not exceed the 1/1000000 of an Inch.

Part of a Cubic Inch. And farther, he hath also plainly demonstrated that one Grain of Sand will contain

125,000,000,000,000,000,000,000,000 of
the aforeſaid Globules of Blood; which is
10,256 Times more than the higheſt
Mountain upon Earth contains Grains of
Sand.

Sand. And yet farther with respect to the Divisibility of Matter, he hath shewn the least Particle of Matter may be made to fill the Orbit of Saturn, so that there shall be no Pore therein, whose Diameter shall exceed the 1,000,000,000,000th Part of an Inch. But as we have likewise taken Notice that there is no Part of any Body, or no Portion of Matter so small, but that a Part of another Body may be exactly as small; so on the other hand, there is no Part of Matter so subtile, but any other, the most gross, may be divided into Parts no bigger than the Parts of that subtile Matter.

P R Q P.

P. R. O P. XIV.

Those secondary Qualities of Bodies called Fire, and Air, act and re-act mutually upon each other: That is, the Air is expanded and rarefied by Heat, which is the Action of Fire; and Fire is excited and put into its most violent and rapid Motion, by the Expansion of the Air.

It has been found, by very numerous and accurate Experiments, that the Atmosphere, or Column of Air which surrounds the Earth, is a compressible and expansive Fluid; whose Density is in Proportion to its Compression: And therefore since the Air is compressed by the Weight of the incumbent Atmosphere, and the Density of Air is proportionable to the Force compressing it, it follows by Computation, that

at

at the Height of about 7 Miles from the Earth, the Air is 4 Times more rare than at the Surface. And at the Height of 14 Miles it is 16 Times more rare than at the Surface; and at the Height of 21, 28, or 35 Miles, it is respectively 64, 256, or 1024 Times more rare; and so on in a geometrical Proportion of Rarity, compared with the arithmetical Proportion of its Height. See *Newton's Optics*.

THAT Air may be rarefied may be very plainly proved, as thus, If you take a Bladder, which appears to you to be entirely empty, and tie its Neck with a strong Thread, and lay it in a warm Place, or before the Fire, the Heat will so rarefy the little inclosed Air, as to make it extend the Bladder to its utmost Stretch, and, if continued, will break through it with the Report of a Gun: Also it may be proved
by

by various Experiments, that Air may be so condensed by Art as to take up but $\frac{1}{60}$ Part of the Space it possessed before.

SOME of our modern Philosophers have found that Air, by the bare Force of its Spring, will dilate itself into 13,000 Times the Space it possesses under the Pressure of the Atmosphere. And as it may be compressed into 60 Times a less Space than that, it is plain, that the Air possesses a Space 780,000 Times greater at one Time than another ; for 13,000 multiplied by 60 is equal to 780,000. It may plainly be proved, by Experiments of the Barometer, that the Pressure of the Air is capable of raising a Column of Mercury to the Height of 28, 29, 30, or 31 Inches ; therefore such a Column of Mercury is equal in Weight to a Column of Air (of an equal Basis) which proceeds from the Mercury

cury in the Tube to the uppermost Part of the Atmosphere : and as Mercury is about 15 Times heavier than Water, therefore Water will rise in a Tube to 32 or 33 Feet in Height ; and therefore every square Foot on the Earth's Surface sustains the Weight of a Column of Water of 32 or 33 solid Feet. Now a Cubic Foot of Water weighs about 63 Pounds ; hence the Weight of Air on every square Foot is above 2000 Pound Weight. So if we allow a middle-sized Man to be about 12 square Feet, then the Weight of Air pressing upon the Body of such a Man is equal to 24,000 Pound Weight ; and had it not been for the internal Air, or the Air within all Bodies ; which though it be small, yet it can balance, resist, and equiponderate the Force of the external Air ; Men, Beasts, Houses, &c. would be crushed to Pieces with such an intolerable Weight of Air.

COROL-

COROLLARY.

AIR loses its Elasticity and expansive Force, in Proportion as it is deprived of the Light or Particles of Fire which it imbibes and retains. For as the Elasticity of the Air is increased in Proportion to the Quantity of these Particles it contains, and the Motion it is put into ; so the total Absence of these Particles, and the Privation of its Action or Motion, would undoubtedly destroy that Property of the Air, and leave it without any Elasticity or expansive Force at all. 'Tis evident likewise on the contrary, that Light or Fire loses all its Motion or Action, and is presently reduced to a State of Rest, as soon as it is deprived of Air. For such is the extreme Fineness and Tenuity of this Fluid, that it might very easily, even in its most ra-

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pid Motion, penetrate the Pores of all Bodies, without making any Change or Alteration upon them, were it not for the Air which they contain ; which being a grosser Element, and being put into Action by Fire, is capable by its great expansive Force, to dissolve and separate the most strongly cohering Parts of mixed Bodies. Various other Experiments and Observations might be made to evince this mutual Action and Re-action of Fire and Air upon each other, and to shew the Necessity of both of them conjunctly, in order to the proper Efficacy and Effect of either : But this Matter is so well known that it would be needless to say any more upon it.

P R O P.

P R O P. XV.

This expansive Force of heated Air, or the mutual conjunct Action of Fire and Air, is the universal Principle or natural Cause of Fermentation, Dissolution, and Fluidity.

UPON the different Proportion and Adjustment of the attractive cohesive Force, we have treated of in the preceding Propositions, and this centrifugal expansive Force, with Respect to each other, the different internal Constitution, Texture, and Cohesion of Bodies will plainly depend; and from thence must be judged of and estimated. By the attractive cohesive Power alone the Particles of all compound Bodies must be brought to their greatest Degree of Contact, where they would remain at absolute Rest, and be fixed into strongly cohering Masses of Matter; whose Densities, Solidities, and Degrees of Cohesion, will be always in

Proportion to the Degrees of Contact in the immediately contiguous and cohering Particles: And therefore by the sole Action of this attractive cohesive Force, all Bodies will become hard, and strongly cohering, Masses of Matter, all Fluidity must be absolutely destroyed; all Fermentation or the intestine Motion, of the Parts of compound Bodies must cease, and all these hard Masses remain fixed and unchangeable in a State of internal Rest and Solidity, without any Fermentation, Solution, or Dissipation of their Parts.

BUT when this attractive cohesive Power of all Bodies is laid aside, and the centrifugal Force or Power of Fire and Air, acts alone, the Consequences are quite different; for now all Bodies, even the most hard and strongly cohering, must be dissolved, dissipated, and diffused, so as to constitute a general fluid Mass of Matter, without

without any Distinction, or different Cohesion of Parts ; but would still be retained within the Sphere of Attraction of their common Centre.

HAVING now pointed out the different Effects of these two Powers or Forces upon all Bodies, while they act separately, we will now proceed to shew the different Effects they have upon all Bodies when they act together, upon their different Constitutions and Cohesions, their various Degrees of Solidity and Fluidity, with the several Changes and Vicissitudes they undergo, with the Corruption and Dissolution that some Bodies suffer in order to make Way for the Generation and Concretion of others. All these must be owing to the different Proportions of those Forces or Powers, acting in Conjunction under certain Conditions or Laws.

WHERE these two Forces or Powers, in the Constitution of any Body or Mass of Matter are equal, that Body or Mass of Matter must continue in, or preserve its present State of Fluidity, Solidity or Degree of attractive Cohesion: As in this Case its Particles of Matter must have the same Quantity of Contact, they can neither approach nearer to, nor recede farther from each other; that is, the Body with Regard to its internal Constitution, Texture, or Cohesion of Parts, can admit of no Change. When the attractive Force is superior to the centrifugal or expansive Force, the Particles of Matter of the Body will be brought nearer to each other, 'till the Quantity of their Contact is as great as the Particles will admit of; and there they will remain in a Degree of Solidity or Force of Cohesion proportionable to their Quantity of Contact. But when
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the centrifugal or expansive Force of the Air and Particles of Fire included in any Body or Mass of Matter, is superior to the attractive Force of the contiguous Particles; the Particles, which constitute any such Body or Mass of Matter, must recede from their Points of Contact: And this happening between every Particle of Matter of which the Body or Mass is composed, every small Particle must be divided from its contiguous Particle, and the whole Body must be divided and separated into minute Particles, and these again into others which are more fine, and so on, 'till they cannot be divided farther.

THIS Receding of the Particles of Matter, which compose all Bodies, from their Points of Contact, is what we may call Rarefaction. And when those Particles approach nearer to their Points of Con-

tact, *i. e.* when the attractive Force is superior to the centrifugal Force, we may call it Condensation. Now, from the Efforts of these Forces being directly contrary, the constituent Particles of Bodies, which have a continual Tendency towards their Points of Contact, are forced off by the centrifugal Force of the Air and Particles of Fire, and there must necessarily ensue an intestine Motion, Collision, and mutual Struggle among the Particles themselves, *i. e.* the Particles acted upon by two Forces which are quite opposite to each other will recede and accede, in Proportion to the Strength of these opposite Powers, 'till one or the other gains the Predominancy, either to condense and fix the Body, or rarefy or dissolve it: And from hence we may judge of the Fermentation or intestine Motion of all Bodies.

WHEN

WHEN the attractive Force or Power in Bodies, is superior to the contrary Power to any considerable Degree, Bodies which are the most fluid and fluxile will immediately be fixed and condensed; as may be proved by Water and other Fluids being turned into Ice, when the Particles of Fire and Air, contained within the Pores and Interstices of such fluid Bodies, are reduced to a State of Rest; upon which the attractive Force or Power of the constituent Particles, becomes superior to the other Power, and the Fluid is immediately fixed and condensed, 'till the expansive Force of the Air and Particles of Fire are again put in Motion; which soon reduce the Body to its former State of Fluidity. It may likewise be very plainly proved, that by the centrifugal or expansive Force of Fire and Air, the most dense Bodies may be dissolved and their Particles of Matter

sepa-

separated, each Particle from its contiguous Particle: to prove which we will give the following Instance.

TAKE any Quantity of the Filing of Iron and Steel, and mix it with strong Spirit or Oil of Vitriol, and immediately there will ensue a strong Fermentation, Effervescence, and Ebullition of the Spirit, with great Heat and Fumes; during which the dense compact Body of the Iron or Steel is entirely dissolved, its Particles divided, and diffused through the dissolving Menstruum; which, from what we have already laid down, may be easily accounted for. The Spirit, immediately after Mixture, rushes into the Interstices and Pores of the Iron, and is strongly attracted by the Parts of the Mineral: By which the Air, which before filled up the Pores and Interstices of the Mineral, having now
very

very little Room to expand, will be forcibly compressed. In Consequence of which Compression, the included Air assumes its elastic Force, by a strong Propensity that Fluid has to expand and fill its former Space; which being counteracted upon by the attracted compressing Menstruum, there must ensue a Fermentation or intestine Motion of the Particles of Matter which compose the Iron. By which the Fire contained in it and diffused through its Substance, will be excited and put into Motion, which heats and expands the Air, and increases its elastic Force: And the Action of the Air being increased, communicates a more violent and rapid Motion to the included Fire, so that by the mutual Action of these two Elements upon each other, the centrifugal Force of the Particles of Iron, becomes superior to their attractive Force; and consequently the
 Particles

Particles of the Mineral must necessarily recede more and more from their Points of Contact, and be separated and divided into the most minute Particles, which will be equally diffused through the whole Menstruum; and the Air, now set at Liberty, will be seen to ascend through the Menstruum in small Bubbles. We should likewise observe, that the Gravity of the minute divided Particles of the dissolved Body being less than the attractive Force of the dissolving Menstruum, this attractive Force of the Menstruum or Fluid suspends such minute Particles, and retains them in any given Position against their Force of Gravity. And from hence we may account for the natural Cause of Fluidity, intestine Motion, Dissolution, and Putrefaction in all Bodies.

SCHOLIUM,

S C H O L I U M.

By this wonderful and most extensive Power of corpuscular Attraction and Repulsion, we may account for most or all the Phænomena of Nature arising from the heterogeneous Mixture and various Associations of Particles of different Bodies; and why, in some Cases, those Particles should readily attract, and in other Cases so strangely repel each other. We will here give a few Instances of some curious Phænomena of Nature, which may very easily be explained and accounted for from those Principles, and to explain which, many Philosophers have had Recourse to baseless Hypotheses, and a great many dark abstruse Terms, and other empty Notions. The Phænomena, I mean, are the Ascent of Vapours, small Particles of Water, and
other

other heavier Bodies, in the Atmosphere ; the Ascent of the Juices from the Roots to the most minute Parts of Trees and Vegetables, of all Kinds ; the Circulation of the Blood thro' the most minute Arteries ; and the Passage of the Lymphatic Parts of that Fluid through the most minute Glands and vascular Fibrillæ.

A GREAT many of our modern Students of Nature have endeavoured to account for the Ascent of Water and other heavy Bodies in the Atmosphere, from the Principles of Hydrostatics only. But as their Assertions will appear false to any Person who has the least Knowledge of natural Bodies, we shall not spend any Time to confute them, but proceed to shew the true Cause of the Phænomena we have proposed.

A Bo-

A BODY being immersed in a Fluid, whose specific Gravity is the same with that of the Body, will every where rest in it, without ascending or descending ; but if the specific Gravity of the immersed Body is less than is that of the Fluid, the Body will swim on the Surface of the Fluid. When the immersed Body has greater specific Gravity than the Fluid in which it is immersed, it must of Course sink to the Bottom by its own Weight, and remain there, except it be raised and suspended by a superior Force. This may likewise be applied to various Fluids, whose specific Gravity considerably differs, and which will not mix when thrown together in the same Vessel, but will take Place according to their specific Gravity ; that which has the greatest specific Gravity will descend to the Bottom, and that which has the least will ascend

ascend to the Surface. Now the centrifugal Force of Air and the Particles of Fire, as we have proved before, forces the Particles of Matter which compose all Bodies farther from their Points of Contact, and thereby divides them, each Particle from its contiguous Particle; but each minute divided Particle will retain the same specific Gravity as any Portion of the Mass from whence it was taken. Water therefore when separated into the most minute Particles by Rarefaction, will still have the specific Gravity with the Fluid from which it was forced, which is computed to be 14 Times heavier than an equal Bulk or Portion of Air, and therefore cannot possibly ascend and be retained in it, by any Law of Weight or Pressure. And we are well assured that all dense Bodies, even Quicksilver itself, with the Assistance of
Heat,

Heat, will be forced into Vapour, and fly off in the Atmosphere.

BUT from our foregoing Propositions, these Phænomena may be very easily explained and accounted for. This attractive Force, with which the minute contiguous Particles of Matter attract and unite, increases as their Weight decreases, or as their Surfaces increase in Proportion to their Solidities; from whence 'tis very plain that their attractive Force increases as their Weight decreases, 'till the latter becomes of no Consideration with Respect to the former. In this Case, the minute Particles of Water, or any other Body, being separated by the centrifugal or expansive Force of the Air and Particles of Fire which is within them, will be attracted, and that strongly, by the contiguous Parts of the Atmosphere, which attract them

the many Way or every Way, horizontally as well as perpendicularly, as if they had no specific Gravity at all.

FROM this same Law of Nature, the Motion of the Juice of Trees and Vegetables, from their Roots, through the very minute Vessels of which the Bodies of Trees and Vegetables are composed, may be accounted for. The Juices of most, or all, Kinds of Vegetables, when left to Nature's Husbandry, are known to descend in Autumn to the Roots, and there remain in a State of Inactivity or Condensation during the Winter; that is, their aerial and fiery Particles are fixed and condensed by the Cold of the Atmosphere, and consequently their attractive cohesive Force is increased, and their Juices altered, from a State of Fluidity to a jelly-like Substance: But when the vernal Sun sheds
his

his Rays upon the Earth, its Particles expand the Particles of Air which is contained in the Pores and Interstices of the Juices, and consequently, as we have explained before, set their elementary Fire in Motion; whence arises,

First, AN intestine Motion of the Juices;

And Secondly, A RAREFACTION for their Substance.

AND since every Fluid, as the Juices are now brought to a State of Fluidity again, will rise in a small open Tube of a given Diameter to a given Height by the Force of Attraction, without any Pressure from the Fluid; and since this Height is always in the reciprocal Ratio of the Diameter; 'tis very evident that a Fluid, by this Means only, may ascend in small Tubes to any

given Height, if the Diameter of the Tube be proportionally lessened ; but when to this is added the centrifugal Force of the elementary Fire and Air contained in the Juices, which divides their Particles, each Particle from its contiguous Particle, and with a strong Impulse forces this rarified Substance up these Tubes, it is no Wonder that they should not only be forced into the most minute Branches, but likewise, where the Resistance is the least, distend their Vessels so, as to form new Branches.

LIKEWISE from the same Principle and Law of Motion, joined to the Pressure of the Muscles, it may be plainly proved, that the Blood in animal Bodies circulates through the most capillary Arteries, and extremely minute glandular Strainers ; and likewise the lymphatic Juice through its capillary Tubes. Muscular Action has certainly

certainly the greatest Share in propelling the animal Fluids through all the Vessels of the Body, and likewise contributes to empty the capillary Vessels of their contained Fluids; but that by this Force alone, the minute capillary Vessels of the Body, should be filled with their proper Fluids, is as much impossible as it would be to force a viscid Juice from the Root through the dense Trunk of a large Tree; which is very certain cannot be done by any Force of Impulse or Pressure whatever.

C H A P. II.
Of A N I M A L S E C R E T I O N .

P R O P. I.

The Blood of all Animals, from whence all the Secretions of the Body owe their Source is a Fluid consisting of globular and serous Particles ; its globular Particles are specifically heavier than its serous Particles, and are endued with a stronger corpuscular Attraction, elastic Force, and which receive and retain a greater Degree of Heat.

TH E Blood of all Animals, when drawn out of the Body, does naturally divide itself into two different Parts,

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called

called globular and serous Parts, of which the red or globular Part does in a very little Time coagulate, but the serous Part remains fluid. These two different Substances, though of unequal Specific Gravities, while they continue to circulate in the Veins and Arteries, and have a proper Degree of Motion and Pressure from the Muscles, and the continued Action of the expansive Elements we have just now described, are equally mixed and blended together. The Blood viewed with a Microscope while it circulates in its containing Vessels, appears to consist of numberless minute red Globules, or Spherulæ, which swim in and are equally diffused through a thin pellucid Lymph, or Serum. When we examine a Drop of Blood, as it is drawing from the Vessel, with the aforesaid Instrument, we shall for a Moment discern a great Number of red Globules (as in the
last

last Observation) swimming in a lymphid Fluid; and perceive how the Globules attract one another, and unite like Spheres of Quicksilver, which as they touch, run into one another; and consequently the Blood divides into two Parts.---After the globulous Part of the Blood is strongly connected together, by the great attractive Force of its Globules, if we carefully examine the ferous Part, with a good Microscope, we shall discover in it likewise a great Number of Particles of various Figures and Magnitudes, which float in a lymphid Fluid. These Particles, which appear to be most saline, do not attract and unite with one another so strongly as the former did, 'till Part of their Vehicle has been evaporated by Heat, and then they may be observed to attract each other as strongly as the Globules did.

TAKE

TAKE any Quantity of this compound Mass, as it is letting out of its containing Vessels, and received in a Porringer, and set it by to rest, that the Particles of which it is composed may take Place according to their specific Gravities; the Globules will be found to unite immediately, by their corpuscular Attraction, and when firmly united, will sink to the Bottom, and there form its globular or coagulated Part, while the Serum will ascend and envelop it. From whence we may plainly conclude that the Corpuscles or Globules, which form the globular Part, must have greater specific Gravities than the Particles of the serous Part.

THIS therefore is certainly Fact without any Contradiction, that the Blood consists of a simple and lymphid Fluid, in which
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is contained Corpuscles of various Figures and Magnitudes, which are endued with different Degrees of an attractive Force. Now of such Particles as the Blood is composed must the Juices be composed, which are secreted from it; therefore as the Particles which compose the Blood are endued with an attractive Force, so likewise must the Particles of the Juices which are secreted from it.

FROM what we have already proved, we may reasonably conclude that the Particles which compose the globular Part of the Blood have a greater specific Gravity than the Particles which compose the serous Part; and of Course must be more dense and strongly connected, and must be endued with a stronger attractive Force; And as the globulous Part or Crassamentum consists of Particles which have the
greater

greatest specific Gravity and are the most dense, so it certainly must be capable of receiving, and retaining, a greater Degree of Heat than the serous Part, which is of a more loose and open Texture.

THE learned Dr. *Jurin* has very much obliged the World in proportioning the specific Gravities of the globulous and serous Parts of the Blood, and common Water. By comparing and adjusting his several Experiments, and taking a mean Proportion, he finds that the specific Gravities of the globulous and serous Parts of the Blood, and common Water, are as 1054, 1030, and 1000 respectively. From whence we may plainly see that the globulous Part of the Blood has greater specific Gravity than the serous Part; as when this is separated it leaves the serous Part

Part specifically lighter than the compound Mass.

THE Globules of the Blood in their natural and healthy State, (which is the State we treat of here, as a vitiated State of the Blood alters the Case much) are certainly of a loose spongy Texture, and contain in their Pores and Interstices a considerable Quantity of its ferous Parts; which being separated by Distillation, is found to be strongly impregnated with Volatile Salt and Oil, and its specific Gravity is to that of common Water, as 1080 is to 1000. But the specific Gravity of the remaining Crassamentum is as 1280: Therefore if we compare this Experiment with that made by Dr. *Jurin*, and take the mean Proportion, the specific Gravity of the Blood-Globules in their natural State will be as 1126.

PROP.

P R O P. II.

*To calculate the absolute and relative Velocity
of the Blood.*

THE absolute Velocity of the Blood, or the Velocity of that Fluid in the Aorta, may be thus determined: The Velocity with which a Fluid flows out of any Orifice uniformly and in the same Quantity, is equal to the Velocity of a Body which describes a Space of the same Length with that of a Cylinder, whose Base is equal to the Orifice, and whose Magnitude is equal to the Quantity of the Fluid that runs out in the same Time, as may be proved by ten Thousand Experiments. Now we will take a middle sized Man, in Health, whose Heart contracts near about 68 Times every Minute, and at each Contraction or Syftole, throws into the

Aorta

Aorta one Ounce of Blood, One Ounce of Blood is equal in Bulk to 1.65 Inch, and consequently 68 Ounces are 112.20 Inches.

The Diameter of the Aorta in a middle sized Man is about 0.7 of an Inch, and there its Orifice is 0.4, by which divide 112.2, the Quotient 280 Inches gives the Length of the Cylinder, or the Space thro' which the Blood will go in a Minute, supposing it were constantly flowing out of the Heart with the same Velocity: But because of the Diastole of the Heart, which we may compute to be about half the Time of a Pulsation, and consequently must throw out an equal Quantity with the Systole, so that the Blood will describe 560 Inches in a Minute; we may allow for the absolute Velocity of the Blood in that Man.

For the relative Velocity. If the Sum of the Sections of the Branches of the Arteries were always equal to the Section of
their

their Trunks, and if the Circuits in which the Blood moves were every where equal, the Velocity of this Fluid would be every where the same as it hath been determined to be in the Aorta. But since it appears by Experiments, that the Sum of the Sections of the Arteries are greater than the Section of their Trunks before the Division; therefore the Velocity of the Blood must decrease as the Number of the Branches increase. And therefore the Ratio in which the Sections increase being given, the Ratio in which the Velocities are decreased will be likewise given. Now when we have any given Number of the Sections of the Branches of the great Artery; and the Sum of the Sections of the Branches to be every where in Proportion to their Trunks: Let the Velocity in the Aorta or great Artery be called A, and the Notion of the Trunk to the Sum of the Sections of any two Branches called

call E: Then A will be equal to the Velocity of the Blood of the Aorta; A E the Velocity after the first Division; A E 2, the Velocity at the second Division; A E 3, the Velocity at the third Division, and so on; so that A E 30, will be the Velocity at the 30th Division.

OUR ingenious Countryman Dr. *Keil*, after many Observations and Experiments, found that the most usual Proportion between the Sections of the common Trunk, and the Sum of the Sections of its Branches, is that of $\frac{1}{12387}$: Upon which Supposition let it be required to find the relative Velocity of the Blood at any Division; for Instance the 30th the Logarithm of $\frac{10000}{12387}$ is 9.9070296; which multiplied by 30, the Index of the Power E, gives 7.2108880 to which the Number answering in the Tables is 0.00162512; that is the Velocity

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in the Aorta, is to the Velocity at the 30th Division as 1 to 0.00162512, or as 615 to 1. And therefore if the Blood in the Aorta move 560 Inches in a Minute, at the 30th Division it will not move one Inch in the same Time; and consequently its Velocity will decrease in the same Proportion to the 50th or 60th Division.

S C H O L I U M.

FROM all this it appears, that, when the whole Mass of Blood and Juices are to be altered, a Course of Medicine should be continued for a long Space of Time, because the Blood moves slower and slower the farther it moves from the great Artery, and consequently it must be some Time before the whole Mass can be affected with the alterative Medicine. And because the Motion of the Blood through Glands which
receive

receive Arteries immediately from a great Artery, is very quick, they may carry off a great Proportion of the Medicine in a very short Time; and consequently it is not the taking of a great Quantity of any Medicine that can alter the Mass of Fluids, but a constant taking of it. And from hence we may see the Reason when the Blood is to be altered by any Medicine, which is apt to pass off through the Glands of the Kidneys, that this Medicine should not be used in large Quantities: For if it pass off by this Outlet, it has not the desired Effect; and if it is taken in a little Time, it mixes but with a small Quantity of the Blood, which must greatly disorder the Animal Oeconomy.

G 2 PROP.

P R O P. III.

Muscular Motion is performed by the Vibrations of a very fine elastic Fluid, which moves through the Nerves, and contracts and restores the nervous Fibrillæ against the Force of the circulating Blood, excited by the Power of the Will, Heat, Wounds, the subtile and active Particles of Bodies, and other Causes.

BEFORE we enter upon the Proof of this Proposition, it will be very necessary to give some Account of the Nature of a Muscle.

A MUSCLE is a Bundle of minute Blood-Vessels, consisting of Arteries and Veins, laid one upon another in very thin parallel Plates, running through the whole Length of the Muscle. These minute Blood-Vessels
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are every where, at small Intervals, contorted and bound about with small, transverse, and spiral Ramifications and Twinnings of the Nerves, which our modern Anatomists call the white, spiral, and transverse Fibres. The Muscle thus formed has two Ends, which are called the Tendons, fastened to two Bones, the one moveable, the other fixed; and therefore when the Muscles contract, they draw the moveable Bone according to the Direction of their Fibres,

BUT before we proceed farther, we should observe that there are two Kinds of Muscles, the one of voluntary Motion, and the other of mere natural or necessary Motion,

THE Muscles of voluntary Motion have their Antagonists, which act alternately in

a contrary Direction, the one being stretched and extended, while the other is contracted ; and these, like all the Phænomena of Nature, are most wonderfully contrived, and plainly point out to us the great Wisdom of their Contriver ; for if the Muscles appropriated to voluntary Motion had not Antagonists or counteracting Forces, the expansive Force of the circulating Blood would not be sufficient to prevent a spasmodic Contraction of the Muscles, whereby the Body would be deprived of that gentle easy Motion it now enjoys.

BUT the involuntary Muscles are composed of Fibres which are not so elastic as are those of the voluntary Motion, and consequently their Power of Contraction is not so strong, nor have they any Need of Antagonists.

Now

Now we will proceed to point out what is in common to both these, as essential to all muscular Motion whatever. In order to which, we shall in the first Place observe, that all the Fibres which compose the nervous Coats that enter into the Structure and Constitution of the Muscles, are endued with a Springiness, and Elasticity, or Power of contracting or restoring themselves, against a given Weight or Force; and that this Elasticity, or contractive restitutive Power is acted upon by an elastic Fluid, which moves thro' the Nerves, and by the Command of the Will, and other Causes, is excited so as to cause a Contraction in any Muscle of the Body.

A GREAT many Objections have been made to these Assertions, by some of our modern Physicians, Anatomists, and others

after their Example ; but in order to prove the Truth of our Assertions and the Fallaciousness of theirs, we will fairly state what they assert to be the Cause of muscular Motion, and prove it to be without Foundation ; afterward we will endeavour to prove, that what we have asserted to be, is in fact, the true Cause of muscular Motion.

THE first Objection they make to this nervous Fluid is, that the Nerves are not pervious, but a Bundle of dense Fibres strongly connected together.

SECONDLY, That the Brain, which contains an infinite Number of the most minute Glands, and which will separate a Fluid, as fine almost as *Æther*, and from which all the Nerves take their Origin, is an useless Organ ; for they that assert the Contractions,

tractions of the Muscles are performed by a natural inherent Property of the Fibres themselves, and do not depend upon any Fluid whatever; and that this contracting and restoring of the Muscles, performed by their inherent contractive, restitutive Power, against the expansive Force of the circulating Blood, is the Cause of muscular Motion.

THIRDLY, They assert, that if there is such a Fluid in the Nerves as we have asserted, it is of the Consistence of the White of an Egg, and is altogether unfit for muscular Motion.

AND Fourthly, No less a Man than the great NEWTON has asserted, that the Capillamenta of the Nerves are each of them solid and uniform, and that this Motion is performed by the vibrating Motion of an Æther,

Æther, which may be propagated along them from one End to the other uniformly, and without Interruption: But how this Æther, which this great Man proves to be 700000 Times more rare than our Air, and consequently, according to his Laws of Matter, must have a very great attractive Force, should move so freely through attractive Matter and not be united to it, he has not determined; he has only asserted that its Vibrations or Pulses move swifter than Light, and consequently above 700000 Times swifter than Sound.

AND Lastly, He has asserted that its vibrating Motion is regularly propagated through Bodies made of uniform Matter, but is reflected, refracted, interrupted or disordered, by any Unevenness in the Bodies.

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THESE are some of the principal Objections they make to what we have asserted, and each of them pretends to prove his own Notions by a Multitude of Experiments.

WE will now endeavour to prove their Assertions to be without Foundation, and only hypothetical, and their Objections false. As thus: The first Objection they make to our Assertions is, that the Nerves are not pervious; and this must appear evidently false to any Person who never saw a Nerve; and that for two Reasons:

FIRST, Whatever is not pervious cannot be nourished, and consequently, by being in continual Action, must wear out soon.

And

AND Secondly, If all Parts of the human Body, or indeed of any other Body, were not pervious, their attractive Force, which then would be the only Force that could act upon them, would soon render them much harder than the most dense Body upon Earth. But strictly speaking, there is no Part of Matter whatever but what is pervious, and consequently is capable of receiving a Fluid. To prove their Assertions in this Point, they insist that the Nerves do not appear to be Tubes even when viewed with a good Microscope. But what will be answered when we assert in our turn that they cannot see, even when assisted with their best Instruments, the Pores of a Body that will emit Quick-silver through them; the insensible Perspiration which passes off from the human Body, which compared to this elastic Fluid
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of the minute nervous Tubes must be a gross Body; they cannot see the Air, which is a dense Body that presses them with some Tons Weight continually. And yet because they cannot see the nervous Tubes, they will make them to be solid and impervious; though according to their own Account, notwithstanding their great Density, and consequently attractive Force, they must let *Æther* circulate freely through them, to cause this Contraction and Elasticity necessary for muscular Motion.

THEIR second Argument to prove, that the Brain does not separate a Fluid from the Blood, to move through the Nerves, and occasion their Contractions and Vibrations, is, that they cannot discover the Nerves to be pervious, even with their best Glasses. But this Notion is built upon such a weak Foundation, that it will fall with

with its own Weight, without the Assaults that it may receive from Reason and Experience. For, in the first Place, the whole cortical Substance of the Brain, may be seen to be nothing else but a Heap of little oval Glands, which receive the capillary Branches of the Veins and Arteries that belong to the Brain, and these terminate in the medullary Substance; which going out of the Cranium, form the Nerves, and Medulla Spinalis contained in the Vertebrae. This medullary Substance may, by a solar Microscope, be plainly seen to be nothing but a Heap of Glands, which are yet smaller than those of the cortical Substance, and the Fibres which take their Rise from this Substance, which is the Beginning of the Nerves, are the excretory Ducts of these Glands: This does not only appear from the Structure of this Organ, but from Reason and Experience.

rience. In the Year 1755 we cut out the fifth Pair of Nerves from an Ox just killed, divided them, and observed them with a good Solar Microscope, and not only our Pupils, but several others, plainly saw them to be pervious: and notwithstanding what has been asserted to the contrary by several of our modern Philosophers, we will not scruple to pronounce them so. But yet all these Glands and Tubes, which compose the Substance of the Brain and Nerves, must be of no Use, according to the Notions of our modern Writers.

THEIR third Objection is, That, if such a Fluid is secreted by the Brain, and moves through the Nerves, it cannot be fit for muscular Motion, being not much unlike the White of an Egg; and serves only to moisten and lubricate the nervous
Fibres

Fibres. Now certainly a Surgeon's Apprentice that ever saw a Nerve, would laugh to hear such Assertions. We always understood that an elastic Fibre would be greatly relaxed, or its Elasticity almost destroyed, by being immersed in such a Fluid as they make this lubricating Matter to be; and likewise we always thought that Glands which are the most minute of any in the Body, would not separate a Fluid of that Consistence from the Blood: And how such a Fluid can be secreted to nourish and lubricate the Nerves I know not, except it be by some *occult Quality*.

WE have inserted these Notions of some of our modern Anatomists and Philosophers, just to prove that they are built upon a sandy Foundation, and not to be trusted to; and now we will proceed to

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resolve

resolve our Proposition, *i. e.* to prove that the Motion of the Muscles is performed by an elastic Fluid which moves through the nervous Tubes, and contracts and restores the nervous Fibrillæ against the Force of the circulating Blood.

THAT the cortical Substance of the Brain is glandulous, and contrived for secreting a fine Fluid from the Blood, and that this fine Fluid is made yet more fine and rare by the medullary Substance, which is a Heap of the most minute Glands in the Body, and likewise, that the Nerves take their Original from this latter Order of Glands in numberless small Pipes or Tubuli, is plain Matter of Fact, and confirmed by the concurrent Observation and Experience of all our ingenious Anatomists: And that such a Fluid as we have here proposed may be seen to flow

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from a Nerve when it is cut, only much more condensed by the Cold and for Want of Motion, is equally true, and in Fact undeniable. Now we find by constant Experience, that by the Power of the Will we can move the Muscles of any Part of our Body, (except those which are involuntary,) with various Degrees of Force; that there is not the least sensible Difference in Point of Time between willing the Motions of the Muscles, and the Motions themselves; that Muscles contracted by the Power of the Will, dilate again immediately after the Soul ceaseth to exercise that Power; and the Soul loseth the Power of moving the Muscles, and of perceiving Pain from Wounds in any Part, when the Nerves of that Part are cut asunder, tied, or entirely obstructed in any other Way. From whence it will plainly appear, that the Nerves are the Instruments

ments whereby the Will gives Motion to the Muscles: And it does this by some Agent which is sent from the Brain, in which all the Nerves terminate, to the Part the Soul wills to move. The exceeding Quickness of this Motion passing from the Brain through the Nerves to the Muscles in the most remote Parts of the Body in an Instant, and its Cessation the very Moment the Cause which produced it ceases to act, plainly shews it to be the vibrating Motion of an elastic Fluid which is very fine and subtil; for it is the Nature of the vibrating Motion of an elastic Fluid to be very swift, and to cease the very Instant the Cause which produced it ceases to act. Now we will suppose this elastic nervous Fluid to be no rarer than our Air, yet it will answer the Intentions we have attributed to it: For a vibrating Motion excited in our Air by the Tremors of Bo-

dies for the Production of Sounds, has been found to move at the Rate of 1140 English Feet in the Second of a Minute, and ceases immediately after the Tremor of the Bodies ceases. Now if the vibrating Motion of the nervous Fluid is no swifter than that of Air, and the most remote Muscle in the Body is six Feet from the Brain, it must move, by the Command of the Will, to that Muscle in the 200 Part of a Second, nearly, which is a Time inconceivable.

WHEN, by the Power of the Will a vibrating Motion is excited in this elastic nervous Fluid, in those Ends of the Nerves which terminate in the Brain; that Motion is instantly propagated, through these minute Tubes, to the Nerves of the Muscles, and excites a like Motion in them,
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by which their Nerves will be contracted, and consequently the fleshy Fibres, which are dependent thereon, will likewise be contracted, and that with a spasmodic Contraction, if the Force of the circulating Blood and the antagonist Muscles did not counteract. And thus when the Muscle is in a State of Contraction, it draws the Parts to which its Extremities are fastened. Thus the Limbs and other Parts of the Body are moved by their Muscles, each of which has two Ends fastened to two Bones, whereof one is more moveable than the other; upon which Account, when its fleshy Fibres are shortened by Contraction, the more moveable Bone is drawn towards that which is more fixed, by Means of an intervening Joint which it turns upon.

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IMMEDIATELY as the Will ceases to act, this vibrating Motion of the nervous Fluid ceases, and when the vibrating Motion of this Fluid ceases ; the Nerves of the Muscles cease to be contracted, and consequently their fleshy Fibres ; and when these cease to be contracted, the Muscle will be dilated as before.

COROLLARY I.

THE Blood moving through the Muscle is pressed forward by the Force of its Contraction ; but by its expansive Force it prevents the Fibres from being drawn into too great Contraction by the Nerves. But when a Muscle is contracted, if it be kept in that State by the constant Action of the Force which contracted it, less Blood will flow through it in a given
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Time

Time than did before: For the Blood Vessels which are interwoven in the Muscle, are compressed and contracted, and consequently their Diameters lessened: So that this Contraction of the Muscle, while it is exerting, forces the Blood forward; but during its Contraction hinders the Blood from flowing through the Muscle in the Quantity it did before. Hence a gentle Motion of the Muscles accelerates the Motion of the Blood; but a spasmodic or convulsive Motion retards it.

COROLLARY II.

THE Forces of corresponding Muscles, in healthful Bodies are measured by their Weights, and the Strength of the vibrating Motions of the nervous Fluid in them, taken together. And if a great Increase of the vibrating Motion of the nervous

Fluid in the Nerves of one Part of the Body be, from some accidental Cause, attended with a Diminution of its vibrating Motion in the Nerves of other Parts; in this Case it is certainly in the Power of Art to decrease that strong vibrating Motion in one Part, and raise it in another: As Blisters, Cauteries, and all other stimulating Bodies, applied to one Part of the animal Body, for the most Part relieve Pain, and allay convulsive Motions in its other Parts.

PROP.

P R O P. IV.

To determine the Force of the Air upon the Blood in Breathings, and likewise the Effects it produces upon the Blood in the Lungs.

BUT before we enter on this Head, it will be necessary for us to give a Description of this Organ, as I think its Structure and Use cannot be too nicely enquired into. The Lungs are situated in the Middle of the Cavity of the Thorax, and are divided into two Lobes by the Mediastinum. The Figure of both Lobes together resembles in Shape a Cow's-foot, being a little concave between the two Lobes, where they embrace the Heart, and behind where they lye upon the Vertebrae; but

but before, where they touch the Sternum and Ribs, they are convex. The Lungs of a Fœtus is the Colour of Blood, *i. e.* of a pale Red; but immediately after the Air enters them, they change their Colour and become pale, though in Adults they are variegated both with the one and the other. They are tied to the Sternum by the Mediastinum before, to the Vertebrae by the Pleura behind, and very often to the Pleura, where it covers the Ribs, in the Left Side, especially after a Pleurisy. The Lobes of the Lungs are covered with a double Membrane; the External, which is a Production of the Pleura; and the Internal, which not only covers the Substance of the Lungs, but its internal Lamina also fills up the Interstices which are between the Bunches of its small Lobes, with little vesicular Cells. The immense Number of
fine

fine Veins and Arteries, which run upon this Membrane, makes it appear almost like a Net-work of them. The Substance of this Organ is composed of a very great Number of little Lobes of various Figures and Magnitudes ; but their Surfaces are so adapted to one another as to leave but very few Interstices. Each Lobe of the Lungs is divided into a great Number of Lobules : And each Lobule contains within its own Membrane, an infinite Number of small and little orbicular Vesicles, which leave small Interstices between them, that are full of little Membranes, like those which tie the Lobes together. The Extremities of the Branches of the Wind-Pipe open into the Cavity of the Vesicles, which are properly formed by its Membranes ; but the small Blood-Vessels spread themselves upon these Membranes

branes like a Net, with frequent and large Inosculations.

THE Vessels which enter the Lungs, are the Aspera Arteria, by which we draw in the Air; the Arteria Pulmonalis, which comes from the right Ventricle of the Heart; and the Vena Pulmonalis, whose Trunk opens into the left Ventricle of the Heart. Each of these great Vessels divides into two Branches, for the two great Lobes of the Lungs, where they are subdivided into an infinite Number of minute Branches. As to every little Lobe or Vesicle in the Lungs, there is a Branch of each of these great Vessels; and the Branch of the Aspera Arteria is always between the other two.

THUS having given an Account of the Structure of the Lungs and its Vessels, we will

will now proceed to account for the Force of the Air upon the Blood in Breathing; and here we will follow the Example of our ingenious Countryman Dr. *Keil*, who very accurately calculated the Quantity of this Force by rational Experiments.

For this Purpose we got a Bladder of an oblong Figure, which, being tied at both Ends, was very much like to a cylindrical Figure: At one End of it we fixed a Pipe, and to the other End we fastened a Weight; this done, we fastened the Pipe at such a Distance from the Ground, as just allowed the Weight to rest upon it; we then found with a very easy Expiration we could raise 10 Pounds Weight. And with the greatest Expiration we could raise 32 Pounds Weight. From whence we may conclude that the Air driven out of the Lungs in the most easy and strong Expirations

pirations was capable of raising each of the
aforesaid Weights.

BUT as the Pressure of the Atmosphere upon the Bladder, being fixed, is equal almost to five Times the Weight it can raise, because the upper Part of the Bladder resists the Force of the Air, just as much as the Weight at the other End; and as the Air presses every where equally, the whole Pressure will be to that Part of it which presses upon the Orifice of the Pipe, as the whole Surface of the Bladder is to the Orifice of the Pipe, which we calculated to be as 160 to 1. Therefore as 160 : 1 :: 20 double the least Weight raised, to $\frac{160}{20}$ which is just 2 Ounces, and in raising the greatest Weight it is 5 Ounces. These therefore are the Forces by which Air is forced out through the Aspera Arteria in an easy and strong Expiration. Now
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(III)

we will consider the Lungs as a Bladder, and the Larynx as the Pipe of the Bladder; then the Pressure upon the Orifice of the Aspera Arteria when the Air is driven out, is to the Pressure upon the Lungs, as the whole Surface of the Lungs is to the Orifice of the Aspera Arteria. Now we will with Doctor *Keil*, put 5, for the Diameter of the Larynx, then its Orifice will be 0.19. Then we will suppose the Lungs to be two Bladders, whose Diameters are each 6 Inches, and their Surfaces 113 each, or the Surface of the Lungs to be 226; therefore the Pressure upon the Larynx will be to the Pressure upon the whole Surface of the Lungs as 0.19 to 226, or as 1 to 1189. And if in a small Expiration the Pressure upon the Larynx is 2 Ounces, the Pressure upon the whole external Surface of the Lungs will be 148 Pounds; and the utmost Force, when the Pressure

Pressure upon the Larynx is 5 Ounces will be equal to 370 Pounds Weight. But as the Substance of the Lungs is not like an empty Bladder, where the Air acts by Pressure only upon its Surface; for every Lobule of this Organ is full of Vesicles, upon the Surface of each of which the Air presses, with an equal Degree of Pressure, as it would upon the Surface of an empty Bladder, of the same Magnitude; and if we would discover the whole Pressure of the Air upon this Organ, we must likewise calculate its internal Surfaces. To accomplish this we will compute only the $\frac{1}{3}$ Part of this Organ to be filled with these Vesicles, where we suppose the chief Pressure upon the Blood-Vessels is to be made, (although it is certainly more) now we have calculated both Lobes of the Lungs to contain 226 Inches, the $\frac{1}{3}$ of which is 75 Inches, which is the Part that

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is full of these Vesicles. Now let us with Dr. Keil, make the Diameter of each Vesicle to be $\frac{1}{12}$ Part of an Inch, (which must certainly be more) then its Surface will be 001256, and the Solidity 0000043, by which Sum if we divide the Space allowed for these Vesicles or 75 Inches, we shall have 17441860, the Number of Vesicles in both Lobes of the Lungs. And if we multiply the Number of the Vesicles, by the Surface of one Vesicle, the Product will give 21906,976, the Sum of the Surfaces of all the Vesicles in this Organ. And then the Pressure upon the Larynx, will be to the Pressure upon the whole Surface of the Lungs, as 0,19 is to 21906.976. Therefore when in an easy Expiration the Pressure upon the Larynx is two Ounces, the Pressure upon the whole internal Surfaces of the Lungs will be 14412 Pounds Weight; and when in a

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strong Expiration the Pressure upon the Larynx is five Ounces, the Pressure upon the whole internal Surface of this Organ will be 36030 Pounds Weight. Though this prodigious Weight may seem incredible, yet we are here to understand, that the Pressure upon each Part of the internal Surface of the Lungs is not greater in any Part, than is the Pressure upon the Larynx, and that this immense Pressure we have attributed to it arises from the prodigious Extent of the Surface of the Vesicles of this Organ.

From the Structure of the Lungs, and the immense Pressure of the Air upon them, may be plainly deduced the great Effects they produce upon the Blood: For, whilst the Fœtus is in the Womb, the Vesicles of the Lungs lying flat upon one another, compress all the minute Blood-Vessels

Vessels which are spread upon them : But, as soon as the Child is born, the Air, by the Dilatation of the Thorax, is thrust into the Branches of the Trachea Arteria, where, by its great Pressure, it blows up the minute Vesicles into Spheres; by which Means, the Pressure being taken off from the Blood Vessels, and they equally expanded with the Lungs, all the Blood has a free Passage through the pulmonary Artery; but when the Air is thrust out again by the Contraction of the Cavity of the Thorax, it being a fluid Body, compresses the Vesicles and Blood Vessels upon them every where equally; and by this Compression the Globules of the Blood will receive the whole Force and Energy of the Air, and be broke into smaller Parts, fit for Secretion and Circulation. But, though these are necessary Consequences of

Respiration, yet it may be very plainly proved, that some Particles of Air do enter the Blood Vessels, and mix with the Blood in the Lungs: As, thus, when Air is shut up in a Bladder and sunk under Water, some of that Air will escape the Pores of the Bladder, when only compressed by the Weight of the Water, into which it is sunk; and if the Weight of the Water will force some Particles of it through the Pores of the Bladder, certainly the prodigious Pressure of the Air upon the Lungs must force some Particles of it into the Blood Vessels.

AND farther it may be proved by the Air-Pump, that Animals cannot live when shut up in common Air, though it still retains its wonted Pressure. And likewise that Instrument shews us, that Animals will

will live longer when shut up in compressed Air; and, that, when an Animal is dying in common Air, it may be much revived by pressing in more fresh Air. Likewise some Particles of Air may be seen to arise from the Blood, when drawn off from the Vein, and immediately put into the Air-Pump, and the Air drawn off. And, as we have proved before, the Particles of Air are expanded and rarefied by Heat, which is the Action of Fire; and Fire is excited and put into its most violent and rapid Motion by the Expansion of the Air: Therefore we may likewise conclude that this Action of the Particles of the Air, upon the fiery Particles of the Blood, must likewise greatly increase its centrifugal Force; and consequently lessen its attractive cohesive Force, and prevent its Globules from running into too close Contacts,

and thereby greatly conduce to keep this Fluid in a proper Degree of Fluidity, when it circulates through the Capillary Vessels.

BUT when this Fluid circulates in the larger Vessels which are near the Heart, it has yet another Cause to prevent the Union of its Particles; for a Fluid moves through a cylindrical or conical Vessel (such as are the Arteries) with a greater Velocity at the Axis than at the Sides. And all Fluids when they are pressed, press again with the same Force upon the Body that pressed them. The Blood therefore is thrust into the great Artery by the whole Force of the Heart, by which Means this Fluid presses upon the Arteries, and consequently dilates them; and as the Sides of the Arteries are elastic, when they return, they not only press the Blood forward, but

but every way, and consequently must produce an intestine Motion, and, as we have proved before, hinder the Attraction of its Particles ; and by this frequent and strong Collision of the Particles of this Fluid, against the elastic Sides of the great Arteries, the Cohesions of the Particles, if any of them happen to cohere, will be broke and dissolved. And, again, as this intestine Motion must greatly increase by a great many of the Particles of the Blood being Elastic ; so by this Resistance of the elastic Sides of the Vessels, they must be forced one against another, and, by being Elastic, reflect from one another, and consequently greatly increase the intestine Motion of this Fluid.

COROLLARY.

UPON this intestine Motion of the Blood depends its Heat, which therefore must be every where proportional to the Action of the Particles against the Sides of the Vessels, and the Sides of the Vessels against the Particles, supposing the Elasticity of the Particles every where the same. Now this Action of the Particles against the Sides of the Vessels, and the Sides of the Vessels against the Particles, decreases, in Proportion as the Sum of the Cavities of the Vessels increases; and, therefore, where the Sum of the Cavities of the Vessels is greatest, the intestine Motion and Heat of the Blood will be least, and the attractive Force of its Particles the greatest.

P R O P.

PROP. V.

The Blood-Vessels of a particular Part of the Body being obstructed, or contracted, or opened, or dilated; determine the Degrees of Velocity of the Blood, and Magnitudes of the Blood-Vessels in all the other Parts of the Body.

WHEN the Artery of any Part is obstructed or contracted, so as to hinder the Blood from flowing through that Part, either wholly or in some Degree; the Velocity of this Fluid will be increased in all the other Parts of the Body, and its Increase will be greater or less according to the Magnitude of the obstructed or contracted Artery.

THE Blood-Vessels of the Part whose Artery is obstructed or contracted will contract

tract and their Diameters decrease, from their losing their proper Quantity of Blood, which, before the Obstruction or Contraction of their Artery, kept those Vessels distended: And the Blood-Vessels of all the other Parts of the Body will swell and grow larger, by the increased Velocity, and Quantity of their Blood; and their Dilatation will be greater or less, in Proportion as the Quantity and Velocity of their Blood are increased. The same may be understood if only a Branch of an Artery of any Part be contracted or obstructed; because such Obstruction or Contraction will always lessen the Quantity of the Blood in the small Vessels it furnishes with this Fluid, and consequently will increase its Velocity and Quantity in the other Parts of the Body.

BUT

BUT when the Artery of any Part is opened, or dilated, the Blood will flow faster into that Artery, because it meets with the least arterial Pressure or Resistance there; and, by the Force of the Heart and elastic Sides of the Arteries, this Fluid will always be forced in the greatest Quantity upon Parts where it meets with the least Resistance, and move slower into all the other Parts of the Body than it did before; and the decreased Quantity and Velocity of the Blood in the other Parts will be greater or less, *cæteris paribus*, as they are nearer to or farther from the Artery which is opened or dilated.

IF an Artery is opened, and the greatest Part of the Blood which flows into it flows out of the Orifice, the Vessels, which that Artery furnishes with Blood, will contract and

and grow less, from their not receiving a sufficient Quantity of Blood to keep them distended. And the Vessels of all the other Parts of the Body will likewise be contracted, and their Diameters decreased, from a Decrease of the Quantity, and Velocity of the Blood in them; and this their Contraction will be greater or less, in Proportion as they are nearer to or farther from the Artery which is opened. When the Coats of the Artery are relaxed or dilated, all the Vessels which that Artery furnishes with Blood, will be distended and grow larger, contrary to what happened to them when that Artery was opened. The same may be observed, proportionally, when, instead of the great Artery of the Part, one or more of its Branches are opened or dilated.

WHEN,

WHEN, instead of the Artery, the Vein of any Part is obstructed or contracted, the Blood will then be totally or in a great Measure hindered from flowing out of the Part; whereby its Vessels will immediately be distended, by the increased Quantity of the Blood, 'till the Force of the Blood will distend them no farther; afterward, if less Blood flow into the Artery of the Part, from the great Resistance it meets with, than did before; the same Changes in the Velocity and Quantity of the Blood in the other Parts of the Body, will be produced as were produced in them by the Obstruction or Contraction of the Artery, as we have observed before.

WHEN the Vein of any Part is opened or dilated, the Blood flows faster through the Part than it did before; because the
Orifice,

Orifice, or Dilatation of the Vein, will greatly lessen the Resistance arising from the Blood which lies before it: The Velocity will thereby be increased in the Artery, and consequently diminished in all the other Vessels of the Body; and the decreased Quantity of the Blood in these Vessels, and the Diminution of their Diameters consequent thereon, will be greater or less, proportionally as the Vessels are nearer to or farther from the Part whose Vein is opened or distended.

S C H O L I U M.

FROM our foregoing Observations it will plainly appear, that if any Part is overloaded with Blood, the speediest Method of relieving it will be by opening the Vessels of the Part itself; and next, the Vessels of the Parts which are the nearest to it. And likewise

likewise if the Blood flows too fast into any Part, from an Opening or Distention of its Vessels, this increased Velocity of the Blood into the Part will be relieved by increasing the Velocity of this Fluid through the other Parts.---If the Blood flows too slow into any Part, from an Obstruction or Contraction of its Blood-Vessels, the Motion thro' this Part will be increased by relaxing, and forcing open the Obstructions of the Vessels.

P R O P.

P R O P. VI.

To explain the Nature and Use of the Secretion of the animal Fluids.

THE Secretion of the animal Fluids is that Separation of them one from another which is performed by the Glands; and to give a rational Description of this important Piece of medicinal Knowledge, it will be necessary for us to range it under the three following Heads.

FIRST, THE different Diameters of the Orifice of the secretory Ducts: For it is very well known that all Particles whose Diameters are less than those of the Ducts, will enter; but those Particles whose Diameters are greater than are those of the Ducts, will be resisted; insomuch that any
Matter

Matter may be evacuated by any of the Glands, if the Diameters of its Particles be made less than are those of the Ducts by which it is to be evacuated, either by the Divisibility of the Matter to be secreted, or by an Enlargement of the secreting Passages.

SECONDLY, The different Angles which the secretory Duct makes with the Trunk of the Artery: for Fluids do always press the Sides of their containing Vessels in a Direction perpendicular to their Sides; which may be plainly proved by the Pulsation of the Arteries, since 'tis to that Pressure that the Pulsation is owing. It is likewise very plain that the Blood is driven forward by the Force of the Heart: so that the secretory Motion is compounded of both these Motions. And it is very certain that the lateral Pressure is most when

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the Velocity of the Blood is greatest ; but not in Proportion to that Velocity ; for the lateral Pressure is very considerable when the Fluid is at Rest ; being then in Proportion to the Density of the Fluid. And in a Fluid like the arterial Blood, which is thrown in a right lined Direction, or in a Direction parallel to the Axis of the Artery, the lateral Pressure will be in a compound Proportion to both ; and consequently if two Particles of equal Diameters but unequal Densities, do arrive with the same Degree of Velocity at an Orifice capable of admitting them, yet they will not both enter it, and be forced through, because their Motion of Direction will be very different. So that the Angle the secretory Duct makes with the Artery is highly necessary to be known in accounting for animal Secretion, even supposing their Diameters and Figures to be the same.

THIRDLY,

THIRDLY, The different Degrees of Velocity with which the Blood arrives at the Orifice of the secretory Ducts. For, since all the animal Secretions are made a Fluid, we can assign no other Reason, why one Part of the Body is of a soft loose Texture, and another Part of a more dense Texture, but this different Degree of Velocity of the Blood at the Orifice of the secretory Ducts; whereby the secreted Fluids are driven or forced into the Parts fit for their Reception with a greater or less Force. — And when we consider the Blood as an heterogeneous Fluid whose component Parts are of different Densities, upon its Stagnation it will precipitate its heavy, and elevate its light Parts, and they all in Time will take their Places according to their specific Gravity; and where the Fluid does not stagnate, the Separation of the heavy Parts from the Light, will be in Proportion

tion to its Degree of Motion : Then consequently the slower the Blood's Motion is, the more of its specifically lighter Particles, or serous Parts, will be separated. And the Viscidity of the separated Fluid will be in Proportion to the Velocity of the Blood at the Orifice of the separating Canal, and the Velocity of the Blood at the Orifice of the separating Canal, will be as the Number of Plications in the complicated Artery, consequently the Viscidity of the secreted Fluid, will be as the Number of Plications in the complicated Artery. But we should likewise observe that as a Gland is nothing else than a complicated Artery which sends excretory Vessels out of its Sides, and afterwards degenerates into a Vein ; when its Coats are relaxed, a greater Viscidity of the secreted Matter will ensue, and *vice versa* : For the secreted Matter will grow more dense by staying longer in the Gland ;

Gland; and its most fine Parts will be evaporated by the Heat of the Body, and consequently the rest will be more viscid.

GLANDS, which are of the conglomerate Kind, have Coats made of muscular Fibres, and force out their Contents by Contraction; and consequently the stronger the Muscular Fibres are, the greater will be the Quantity and Velocity of the secreted Matter. Therefore whatever makes a universal Relaxation of the muscular Fibres will increase the Density of the Matter secreted in the conglomerate Glands.

WHEN we would know the Quantity of a Fluid which is separated in any Gland, we must first know the Velocity and Quantity of the Blood at the Orifice of the Gland, together with its Density, and

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the Largeness of the Orifice of the Gland. For the Celerity of the Blood's Motion, the Largeness of the Orifice, and the Density of the Blood being given, the Quantity secreted must be as the Quantity of the Blood directly; for the greater the Quantity of the Blood, the greater will be the Quantity secreted, and the less the Quantity of Blood, the less will the secreted Matter be. The Quantity of Blood, its Density, and the Wideness of the Orifice being given, the Quantity of the secreted Fluid will be directly as the Celerity; and the greater the Celerity, the greater will the Quantity of the separated Matter be, and the less, the Celerity the less. The Quantity of the Blood, its Celerity, and Density being given, the Quantity separated will be directly as the Largeness of the Orifice; for the larger the Orifice, the more will be separated, and the

the less, the Orifice the less. The Quantity and Celerity of the Blood, and the Wideness of the Orifice being given, the Quantity separated will be reciprocally as the Viscidity of the Blood; for the greater the Viscidity, the less will be the Quantity of the secreted Matter, and the less the Viscidity, the more: And when none of these are given, the Quantity secreted will be as the Quantity of the Blood.

BUT lastly, The Quantity of the secreted Matter may likewise vary from what we have asserted, by the Blood having been more or less drained of its lymphatic Particles before in other Glands. Of this we have a very strong Instance, in the Secretion of the Bile in the Liver; and as this is a very material Thing to be known by all Practitioners of Medicine, we will give a

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thorough

thorough Description of this curious Apparatus,

'Tis very well known to all Persons who ever observed this Organ, or knows an Artery from a Vein, that the Order Nature takes to furnish this Organ with Blood is very extraordinary, and different from the Method she takes to furnish all the other Secretions with this Fluid: all the other Secretions receive their Blood from the Arteries, but this from the Veins,

THE Blood, with which this Organ is furnished, is, by the Arteries, dispersed through the Intestines, Caul, Mesentery, Pancreas, Spleen, Stomach, and Gall-bladder, and by the correspondent Veins returns, which uniting in a large Trunk, is commonly called the Vena Porta. The Blood after this large Circuit is brought to the Liver, and divided through its whole
 I Substance

Substance by the minute Branches of this large Trunk, which, with Respect to this Organ, performs the Office of an Artery. From these minute Branches of this Vessel is the Bile secreted by the small secretory Ducts of this Organ, after the same Manner as the other Secretions are separated from the Arteries, in all the other Glands. Now we ought greatly to admire this extraordinary Method Nature takes to furnish this Organ with Blood:

FIRST, From the numberless Vessels it passes through before it arrives to its destined Place,

AND secondly, From the Nature of these Vessels, and the Changes it undergoes,

IN the first Place we should observe, that all the minute Vessels, through which
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the Blood passes before it comes to the Liver are abundantly stocked with Glands; thro' which a very great Part of its lymphatic Particles must be drawn off, before it can enter the Porta, to be conveyed to the Liver. And when we consider the Nature of these minute Arteries dispersed every where thro' the Abdomen, and the great Number of secretory Vessels with which those Parts abound, we must conclude that the Blood, from the continual Drain of these secretory Vessels, must be deprived of a great Quantity of its fine lymphatic Particles before it arrives to its destined Place: And from this it will plainly appear, that this large Drain of Lymph in these Vessels, is to prepare the Blood for the Secretion of the Bile in the Liver. This Assertion will be much confirmed if we consider the Nature and Use of the Spleen, and what

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is performed there to the same Purpose, and with the same Design as already mentioned.

THE Spleen is a large, soft, and spongy Bowel, situated in the left Hypochondrium, between the Stomach and Bastard Ribs; consisting of a large Contexture, and Congeries of Blood Vessels, Nerves, and Lymph Ducts. I cannot exactly determine the precise Dimensions of the splenic Artery, but it is known that the Circumference of the coeliac Artery does not, in a middle sized Man, exceed half an Inch, or .5, and consequently its Square is .25; and therefore the Square of the splenic Artery, which is a Branch of it, cannot be above .18. Now the Dimensions of the Spleen in a middle sized Man, are six Inches in Length, three in Breadth, and two in Thickness. But we will with Dr. Keil,

Keil, compare it to a Cylinder of two Inches Diameter, and therefore the Square of its Circumference will be 36, which being divided by the Square of the Circumference of the Splenic Artery, the Quotient will be 200; so that the Blood moves 200 Times slower in the Spleen, than in the Beginning of the Splenic Artery. And when we consider the great Quantity of Glands which are contained in this Organ, and the great Quantity of the Lymphatic Particles, of the Blood which must be secreted by them, the Use of this Organ will be very easily accounted for.— From all this Art and Contrivance it is very plain, that the Intent of this Organ is to diminish the Velocity of the Blood, and to separate a proper Quantity of its Lymphatic Particles. And that such a slow Motion, and Drain of this Fluid, is absolutely necessary for the discerning of the
Bile

Bile in the Liver, is very evident ; for such a viscid Secretion, and a Secretion which is replete with Oil and volatile Salts, as the Gall is, could never have been separated from the Blood, except its Lymphatic Particles had been in a great Measure separated, and its Motion abated. For if the Fluids which are separated from the Blood by the Glands are at all Times and Places the same in the Blood, and not formed after the Manner demonstrated, what Need was there for diminishing so considerably the Velocity of the Blood? Let the Blood move fast or slow, they would be always the same, and always in an equal Aptitude to be secerned.

THIS Secretion is certainly the most useful of any in the Body : and the drawing off a Líquor from the Blood in so small a Quantity as is here drawn off, and which
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is endued with so many important Qualities, necessary to animal Life, is certainly very wonderful. For this Secretion is a potent Dissolvent, a very good Precipitant, and a very benign Cathartic. The Bile is well known to be the Refiner and Purifier of the Chyle, the Cleanser and Strengthen-ener of the Primæ Viæ; and when this salutary Secretion is either not made in the Liver, or obstructed in its Passage, so that it cannot be mixed with the Chyle in a proper Quantity, all the animal Fluids are presently tending to Corruption, Putrefaction and Stagnation.

WE should yet farther observe one Thing, which is of the utmost Consequence to be considered and explained with Respect to glandular Secretion; and that is, the Nature and Use of the Lymph, or explain the Reason of the large and continual

tinual Secretion of the lymphatic Particles from the Arteries, which are returned again upon the Blood in the Veins. And as this is a very curious Phænomenon and very essential to be known by all Practitioners in Medicine, we will here give a Description of it.

But preparatory to this, it is necessary to remark, that the Heat, Fervor, and Activity of the Blood, do for the most Part reside and are retained in the globulous Part, and in that Part of the Serum which has the strictest Union with it; as these are the Parts which are the most plentifully saturated with volatile Salts and Oils, and consequently consist of the most subtile and active Parts of this Fluid. But the lymphatic Particles of this Fluid, which freely and universally pass through the Glands, are much finer and thinner, and
plainly

plainly appear to be a cooling diluting Fluid, which serves to cool and absorb the active Particles of the Crassamentum, especially when the Velocity, and consequently Heat, of this Fluid is increased.

THESE lymphatic Particles therefore, to prevent their being coagulated by the Heat of the Crassamentum in the Arteries, are continually secreted off thro' the lymphatic Glands; and after they have been carried about in the lymphatic Vessels with a slow Motion, whereby they may be cooled and somewhat condensed, they are again returned upon the Blood in the Veins, by which that Fluid is cooled and diluted, and its natural Heat preserved; which otherwise would be continually increasing, and soon become unfit for the Purposes of the animal Oeconomy.

AND

AND that this is the true Intention of the circulating Lymph, will plainly appear, when we consider the State of the Body in Fevers, where the lymphatic Secretions are retarded, and these Particles kept to circulate with the arterial Fluid. Here, by the Heat and Rarefaction of the whole Crassamentum, the Blood-Globules are enlarged, and consequently their attractive Force increased, whereby they attract and retain a greater Quantity of the Particles of the serous and lymphatic Parts, and the remaining Parts of this Fluid coagulates with the Heat, and strongly adheres to the Crassamentum or globulous Part: In this Case all the Secretions, particularly that of the Lymph, must of Course be diminished, and, in Proportion to their Diminution, will the

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Heat

Heat of the Blood always increase, 'till by cooling and diluting Medicines, and Regimen, the Rarefaction is again allayed, the Particles of the Lymph dissolved and disposed to separate from the Blood-Globules, and the lymphatic Secretion, and Circulation again take Place, whereby the Fever soon ends, and the Blood returns to its natural Heat.

P O P.

P R O P. VII.

The expurgatory Secretions always increase by Exercise and Watching, and decrease by Rest and Sleep: But, on the contrary, the Secretions of the lymphatic Juice are lessened by Exercise and Watching, and increased by Rest and Sleep.

THIS will appear plain to any Person who is acquainted with the Nature of these Discharges; the most considerable of which are the Fluids which pass off by Perspiration and Urine, and to which all the others bear but a small Proportion.

Now daily Experience teaches us that both these great Evacuations are considerably increased by Exercise and Waking, and considerably decreased by Sleep and

Rest. The learned *Sanctorius* has very plainly demonstrated this, as hath likewise our ingenious Countryman Dr. *Keil*, who must be supposed to surpass *Sanctorius* in this Particular, and his Observations to be more just and correct, especially for the Inhabitants of this Isle. This Gentleman made his Observations near about the Middle of this Kingdom, and observed the several Degrees of Heat and Cold through a successive Course of ten Years. He plainly proves, that though the fore-mentioned Discharges may be increased or decreased by the different Degrees of Heat and Cold, and by the irregular Use of the Non-naturals; yet in a mean Proportion and when the Body is in a healthful State, the Quantity of Perspiration which passes off by Day is to the Quantity of it which passes off by Night, as 3 to 2 nearly: *i. e.* the Quantity perspired in a given Time, when

when the Body is in a State of Inactivity and Sleep, is but $\frac{1}{3}$ of the Quantity which is discharged by this Evacuation, when the Body is in Action. This Gentleman has likewise proved that the Discharge by Urine is increased or decreased nearly in the same Proportion, under the foregoing Circumstances with that of Perspiration. From whence we may lay it down as a Fact, that these two expurgatory Secretions, being the most considerable of all those Discharges, are decreased by Rest and Sleep, and increased by Watching and Action.

It is known to every Body what surprising Effects may be wrought upon the human Body by Opium, *i. e.* Pain is eased, Rest procured, a violent Flux of any of the expurgatory Secretions immediately abated, and the Patient, immediately after

the taking of this Drug, feels such an agreeable Sensation as Tongue cannot express; But the Effects of this wonderful Drug, especially this of lessening the Discharge of the expurgatory Secretions, have been ridiculously attributed to some specific or occult Quality in it. But I will venture to say that those who maintain, or believe this Doctrine, may take it for a Fact that there is no Effect in this Drug, nor in any other material Substance in this Globe, but what they may comprehend the Cause of, if they will but give themselves the Trouble to search after it, and not build their Faith upon such empty vague Notions.

BUT before we proceed any farther in resolving our Proposition, we will enquire into the Nature and Quality of this wonderful Drug, and endeavour to point out the

the true Cause of those Effects it has upon the human Body.

OPIUM is the Juice of the African white Poppy Heads, which issues from Incisions made in them, thickened in the open Air into a solid, but softish, resinous Gum; it consists of,

FIRST, A Gum, which is the Juice of the Plant condensed by the Air.

SECONDLY, A Resin, which is the oily Particles of the Plant likewise condensed.

THIRDLY, Some terrestrial Feculencies, or the more gross Particles of the former Juices, not perfectly refined by Circulation in the Plant.

THIS is Opium in its natural State; but when its Particles undergo that severe Torture, called a Chemical Analysis, there may be extracted from it, first, a volatile alkaline Spirit, about $\frac{1}{3}$ Part of the whole. Secondly, a foetid Oil, about $\frac{1}{5}$ Part of the whole; and thirdly, some terrestrial Substances. This is Opium when tortured by Fire. Therefore we may conclude that the Virtues of Opium are owing to a volatile alkaline Salt, which is intimately mixed with a pungent aromatic Oil, and these enveloped in a more gross Substance, or the terrestrial Feculencies: And now let us consider how this Medicine can have such surprising Effects upon the human Body. And here we must observe that the great Effect, and upon which all the other Effects depend, wrought upon the human Body by this Drug is Sleep,

or Rest ; and before we can properly explain how Opium causes Sleep or Rest, we must endeavour to define distinctly what Sleep is, or what Difference there is between an animal Body, when awake, and when asleep.

AND first, then, we must observe, that Sleep is a Cessation from all voluntary Action, *i. e.* when we are awake we perform all Kinds of Motion by the Contraction of our Muscles; but when asleep, all these Muscles, except those appropriated to involuntary Motion, or to which the Mind has always given such a constant Supply of Spirits, that it does it without the Assistance of any of the other Faculties, are in a Kind of Relaxation, or Looseness, and all the antagonist Muscles are in an Equilibrium and Equality of Action, not in the least overpowering one another. For

as the Parts are over-stretched by Exercise, so it seems to be the great Design of Sleep, to enable the over-stretched Parts to recover their former Elasticity and Tone. We must next observe, that by Sleep there is not only procured a Suspension from acting, of all our bodily Organs, except those appropriated to involuntary Motion, but a Cessation from such Thoughts as will disturb the tranquil Scene. From hence we must conclude that the Motion of all the Fluids of the Body is even and regular, and consequently, as we have observed before, all the minute lymphatic Secretions will be increased, and those which depend upon muscular Motion will be decreased. Hence also we observe that the Influx of the nervous Fluid into the Organs of the Body, and its Reflux to the Brain, is very inconsiderable in Sleep: For

For'tis muscular Motion and Sensation, that cause the Influx and Reflux of this Fluid; but yet by the continual Supply being brought to the Brain of the arterial Fluid, it will be continually separated there, and fitted to be instantaneously protruded thro' its minute Tubes.

FROM hence we may likewise observe that the Time of Watching is the Time of wearing out the Organs of the human Body; and the Time of Sleep is the Time in which they are repaired and recruited. For Action does always impair the Springs of the elastic Fibres, and waste their Substance, which cannot be restored but by their being in a State of Inactivity, and by the regular and uniform Course of the arterial Fluid, which must consequently follow. And from what has been said it will plainly appear, that whatever produces

duces such a Disposition of the Solids and Fluids of the Body as we have described will cause Sleep, and whatever hinders this State here described will hinder Sleep: In-
 somuch that this is the only Means Nature has to preserve the animal Oeconomy. And thus we see how necessarily continued Exercises make us sleepy, as these weaken the Springs of the Fibres, greatly promote the expurgatory Secretions, and consequently incline the Mind not to promote any more Motion, upon the Account of the Pain and Uneasiness, with which a too violent Attention of the Parts is always attended: Then certainly we must needs desire to relax, or lie down to rest.

It is a well known Observation, that when a Person has eaten a full Meal, he is very soon after inclined to sleep. This Sleepiness is certainly owing to a different Cause,

Cause, and comes near to the Effects of an opiate Medicine, therefore demands our Observation.

It is easily demonstrated that Hunger is a disagreeable Sensation caused in the Stomach, by the Juices of that Organ irritating its nervous Fibres, for want of other Matter to act upon; but as soon as these Juices have other Matter to act on, and prevent their irritating the nervous Coat of this Organ, this Sensation ceases: And when the Person has made a full Meal, the Coats of the Stomach will be distended, and, by the intestine Motion of the Aliments, gently stimulated and warmed; whence follows a delightful Sensation, which is accompanied with a smooth Undulation of the nervous Fluid towards the Brain; by which the Mind is so tranquil and easy, that it does not determine this
Fluid

Fluid into the Organs of Motion, *i. e.* there is such a Relaxation of the Muscles, and such a regular Motion of the Fluids, as we have before proved to be most conducive to Sleep. Besides this, we must likewise observe, that when the Stomach is distended with Aliments, it presses upon the descending Trunk of the Aorta, and consequently lessens its Diameter, and thereby the Blood cannot flow so fast as usual through the descending Arteries, but its Quantity must be increased in the ascending Arteries; whereby the Brain is loaded, and the Derivation of Spirits into the Nerves diminished, and an Inactivity or Drowsiness ensues.

Now we will proceed to point out the Cause of those pleasing Effects which Opium produces in the human Body. The first and most

most sensible Effect of Opium, when taken into the Stomach, is an agreeable Sensation, or very pleasing ecstatic Quietude. This pleasing Sensation, is caused by the volatile Alkaline Salt, which is contained in the Opium, inveloped in a fine aromatic Oil, by which is formed a natural Sapo. These, by lightly rarefying the Juices of the Stomach, and causing a pleasant Titillation of its Vessels, particularly of its nervous Coat, will produce an agreeable Plenitude, and a smooth Undulation of the Fluid of the Nerves towards the Brain, by which the Thoughts are thrown into such a pleasing Delirium, that the Mind is taken off from all other Objects and Concerns, to attend the present agreeable Impression upon, and Undulations of, the Nerves. — Such an agreeable Sensation produced in the Stomach, with its Effects, we have before

before proved to be the Cause of Sleep, for this engages the Mind, and the Soul is, as it were, amused so that it does not think, nor exercise itself about any external Objects, but is inclined to rest, and be tranquil.

In this agreeable State of ecstatic Quietude, the Circulation increases, and the Blood moves uniformly through its containing Vessels, by which the Pulse beats more quick and strong, the natural Heat is equally diffused, and the Blood gently rarefied: In Consequence of which the Cervical and Carotid Arteries will be moderately distended with Blood, and thence pressing upon the secretory Vessels of the Brain, checks, and in some Measure hinders, the Derivation of the nervous Juice into the Organs of Sense and Motion, and consequently

quently the Person is induced to a State of Sleep.

WHEN the Quantity of Opium which is given is somewhat less than what is necessary to produce a sound Sleep, it affects the Person only with a pleasing Sense, which makes him so transported that he cannot express himself; he enjoys such a perfect State of Indolence and Quiet, as no Happiness in the World can surpass, and which he thinks is equal to Heaven. When Opium is given in yet a less Quantity, it serves only to strengthen and animate the Person, and fit him for the strongest of Exercises; as now its Operation is like that of a moderate Quantity of rich Wine, or any Sort of Liquor which is agreeably warming. And thus the Effects of this Drug may gradually increase, from causing a pleasant Invigora-

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tion, to a deep Sleep; which Sleep, if the Opiate is taken in too large a Quantity, ends in an incurable Lethargy or Apoplexy.

THE Cause of the Effects of Opium being such, we may very plainly see by what Means this Drug eases Pains, or checks immoderate Evacuations. This is performed not only by diverting the Mind with a pleasant Sense, and withdrawing it from a disagreeable one; but, as Pain is always attended with a Contraction of the Part, that Relaxation of the Fibres, which is now caused by the Effects of this Drug, eludes and destroys the Force of all Stimulus. The same may be observed in immoderate Evacuations, as there is for the most Part an Irritation of the Vessels from which the Evacuation is made, the Removal of which will certainly abate the Discharge.

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And in this lies the incrassating Quality of this Medicine ; for, when the sharp Humour ceases to irritate the Vessels of the Part upon which it falls, that disagreeable Sensation, which before affected the Mind, will now be taken off ; and consequently the Mind will not use her utmost Efforts to throw off this sharp Humour, and very often thereby occasion Spasms and convulsive Motions of the Part, but suffer it to lodge there in a greater Quantity, before it is so troublesome as to be thrown off ; for it is the same as if there was not any Irritation of the Part, if the disagreeable Sensation thereof be not taken Notice of by the Mind.

THESE are the most general, and particular Effects of this Drug, in all Persons and at all Times ; and according to the Quantity taken at a Dose, it greatly ani-

mates and strengthens, eases Pain, raises a very agreeable Sensation, and at last ends in a sweet Sleep.

FROM all these Observations we may plainly conclude, that all the expurgatory Secretions are lessened by Rest and Sleep, and increased by the contrary; and likewise the Secretions of the lymphatic Glands will be increased while the others are decreased, and decreased while the others are increased; as the less the Quantity of serous Particles are which are drained off from the Blood by the expurgatory Secretions, the greater will the remaining Quantity be which are to be secreted by the lymphatic Glands.

PROP.

P R O P. VIII.

To explain Digestion in its regular and natural, and in its irregular and unnatural Order.

VARIOUS have been the Opinions of the learned upon this Subject, and various groundless Notions have appeared in the World upon this Head; how much the Generality of Mankind may be satisfied with them I know not, but this I will assure my Readers that they are very unsatisfactory to me. The Error of a great many who have endeavoured to explain this Subject, hath lain in their attributing this Function only to one Cause, and excluding all other Causes which may be concerned therein: And this Cause some attribute to one Thing, some to another. The antient

Writers on Medicine attribute it to some specific Quality in the Juices of the Stomach, and other such nonsensical Whims. Some of the Moderns, thinking themselves more learned, lay aside the Notions of their Forefathers, and attribute the Cause of Digestion to an acid Menstruum in the Stomach, which is capable of dissolving our Aliments, and converting them into Chyle: But those Writers were always forced to take Refuge under the Shadow of a Structure, which, with the least Gale of Wind, is in Danger of falling down upon their Heads; as those Men themselves, and not only they but the greatest Chemists, are obliged to confess that they never could extract any Acid from the Blood, or any other animal Substance. But yet they will assert that Acidities are always found in the Stomach and first Passages; but we are obliged to say that this Assertion is not true,

true, as we have made some hundreds of Experiments upon the Humours of the first Passages, and never yet could find any that will cause an Ebullition, Fermentation, or Conflict, with Alkalies; and we are well assured that when we eat acid Aliments or drink acid Liquors, after they have been in the Body long enough to be saturated with the Juices of the first Passages they are no more acid: And what is commonly called an Acidity of the Primæ Viæ, proceeds from an alkalescent or rancid Acrimony of the Juices, and may be relieved by Acids.

THEREFORE, to avoid falling into the like Error with those we have already mentioned, we shall observe that all Bodies universally contain within themselves the natural Principles of Dissolution, (as we have proved in Chap. I. Prop. XV.) and

that the Particles of Fire and Air which enter into the Constitution of all material Substances, will, when excited and put in Motion, exert their centrifugal Force so as to dissolve and disunite all Bodies into the most minute Particles of Matter.

Now to produce this wonderful Effect, *i. e.* to excite and put into Action the Particles of Fire and Air which are retained in the natural Texture and Constitution of all mixed Bodies, and thereby to dissolve and disunite their cohering Particles, each Particle from its contiguous Particle, there is nothing else required than a sufficient Degree of Heat, and a small Degree of Motion, to excite to Action these expansive Elements, or the centrifugal Force of all Particles of Matter: And to answer this Intention the Stomach is sufficient, without any Acid or dissolving Menstruum
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whatever ; for the Stomach is to be considered,

First, As a warm, moist, and close Vessel, into which the heterogeneous Mass of all our Aliments is received and retained,

Secondly, as an Organ, into which is secreted a large Quantity of serous Humours, for diluting, and blunting the sharp Points of, the Aliments,

Thirdly, as it acts upon the Aliments, not only by its warmth, but by the Contraction of its muscular Coat, and by an external Force which it receives from the Pressure of the Diaphragm, and abdominal Muscles. And from the Concurrence of all these different Causes are the Particles of Fire and Air contained in all Bodies, taken into this Organ as Aliment, excited to Action.

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THEREFORE, to apply this to the Business of Digestion, it may be observed, that all the solid and fluid Aliments thus swallowed, having been first broken and divided by Mastication, diluted with the Saliva, and mixed with the Air, are now received into this close and warm Organ, where they begin immediately to ferment, or have an intestine Motion, occasioned by the Particles of Air contained in, and swallowed with, the Aliments, being greatly rarefied by the Heat of the Stomach; and we have plainly proved before in Chap. I. Prop. XIV. that Air, when rarefied by Heat or Fire, has a very great expansive Force, and, by the Force of the Air, Fire is excited to Action, and these, acting in Conjunction, are capable by their great centrifugal Force to dissolve and separate the most strongly cohering Particles of
mixed

mixed Bodies, so as to constitute a general fluid Mass of Matter, without any Distinction or different Cohesion of Parts. But as there is in all Bodies an attractive cohesive Force, by which all Particles of Matter are kept in close Contact with each other, it will plainly appear, as in the Case before us, that when the Particles of Matter are acted upon by these two Forces, which are directly opposite to each other, and when the centrifugal Force, occasioned by the Rarefaction of the Air and Action of the Fire, begins to prevail, there must necessarily ensue an intestine Motion, Collision, and mutual Struggle among the Particles themselves, whereby they recede and accede from and to each other, in Proportion to the Strength of these two Powers. But, as the expansive Force of the Elements increases, the Parts of the Aliments must be dissolved, and diffused so as to constitute

constitute a fluid Mass: which Mass, being mixed with the Juices of this Organ, will be reduced to a Substance not much unlike a thin frothy Jelly: And this is the first Scene of Digestion, which may be called rarefactive Dissolution.

THE Aliments being thus far digested in the Stomach, are thrust forward through the Pylorus, by the Contraction of the Muscles of this Organ, and emptied into the Duodenum or first Gut, where they are mixed with the Bile and pancreatic Juice, and undergo a second State of Digestion, which we shall explain, after having made some Remarks upon what we have said of this.

WHAT we have here asserted plainly demonstrates, that Bodies, whose Particles of Matter have the strongest attractive cohesive

hesive Force, are the hardest to be dissolved and digested by this Organ; thus Oils, and all oily Aliments, being endued with a very strong cohesive Force, will be found hard of Digestion, and grow rancid, when taken in any Quantity upon a weak Stomach. This Rancidity arises from the intestine Motion or Fermentation of the oily Substance, caused by the expansive Force of the Air and Fire contained therein; but, as the cohesive Force of this Kind of Aliment is very great, it will be some Time before the centrifugal Force gets the Predominancy, and the Body be dissolved: And during this there must be a Fermentation and intestine Motion of the Particles of the Aliment, for the Reason we have just now assigned; and from which there very often ascends ardent and bitter Eructations, and an inflammable Matter regurgitates into the Mouth, which some take
for

Bile, and others for Acidity, &c. but that it is neither Bile, nor an Acid, may be plainly proved from its flaming like Oil when thrown on the Fire, whereas either Bile or an Acid, being cast on the Fire, will extinguish it.

THERE is another Phenomenon very commonly observable, which we are now to explain, otherwise some may object to what we have said, as this at first Sight seems contradictory thereto. That is, when a gluttonous Person comes home from a Feast where he has crammed his Stomach with a Variety of Meats and Drinks, he finds himself sleepy and inclined to rest, goes to bed and sleeps; next morning when he wakes he finds himself very uneasy, with a great Load at his Stomach, and at last urges to cast, and after some Reaching and Uneasiness brings up

up his Crapula of the preceding Day, whole and undissolved, and afterwards finds himself easy. Now from this some may be ready to object to what we have said: for, say they, if the expansive Force of the Fire and Air, which are contained in, and enters with, the Aliments, when set in Action by the Heat and muscular Force of the Stomach, is the Cause of Digestion, or the Dissolution of the Aliments, why should not this have the same Force upon them at all Times. To this we answer, that it has the same Force at all Times, when the Heat of the Stomach and the Strength of its muscular Fibres are the same; but in the Case now before us, the super-abundant Quantity of Aliments lies so heavy upon the Coats of the Stomach as to render them Paralytic, and consequently incapable of Motion; whereby its Heat must be decreased because of a Stagnation
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of its Juices, for want of Motion, and the Contractions of its Muscles greatly abated : and, 'till the super-abundant Load is removed, there can be no regular Digestion or Dissolution of the Aliments.

WE observed before, that after the Aliments are forced out of the Stomach through the Pylorus, they meet with the Bile and Pancreatic Juice, in the Duodenum or first Gut. Now the proper Use of the Bile and Pancreatic Juice are to dilute and dissolve the dissolved Aliments yet more, to separate their fine Particles from their more gross, precipitating the more gross Particles as Fæces, and preparing the more fine like a thin, white Liquor, resembling Milk, which is commonly called Chyle.

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THIS Liquor being thus purged and depurated of its more gross Particles, is received into very minute Pipes or Strainers, which are ranged all along the Sides of the Duodenum, or first Gut, and Jejunum, or second Gut, by the corpuscular Attractions of those minute Vessels, commonly called Lacteals, where it undergoes a farther Degree of Attenuation and Dilution, by the great Quantity of lymphatic Juice which joins it, from the great number of lymphatic Ducts which empty themselves in the chyloferous Vessels; and with this lymphatic Juice the Chyle passes into the Blood by the left Subclavian Vein.

BESIDES this Action of the Bile in purifying the Chyle, it performs another and very essential Office in the Body; for, after the more fine Particles of the Ailments are separated, and the more gross precipitated,

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the Bile greatly helps forward the Operation of that great Outlet by which all the gross Particles of the Aliments are to be evacuated; as by its dissolving and stimulating Qualities, it keeps these gross Particles from running into too hard and dry Concretions; and likewise gently stimulates the Coats of the Intestines, and promotes their muscular, vermicular, or peristaltic Motion, so as to help forward these gross Substances by Stool.

THUS is the Scene of Digestion, or Dissolution of the Aliments, carried on in the first Passages; and while the primary great concoctive Gland performs its Function, and the Blood is supplied with a proper Quantity of well digested Chyle, all the animal Powers will be strong and vigorous, and the Body remain in a State of Health. But as these concoctive Powers
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of the first Passages are subject to a great many Irregularities, it will be necessary for us to point out these Irregularities and their Cause.

We have already observed, that the first State of Digestion or Alteration of the Aliments, is performed by the centrifugal Force of the rarefied Air, and Particles of Fire, contained in, and swallowed with, the Aliments, excited by the Heat and muscular Contraction of the Stomach. Now, if the Heat and muscular Contraction of the Stomach are too great, their Action upon the expansive Elements will be too intense and strong, and the Effects will be a hot and flatulent Digestion, *i. e.* when the centrifugal Force of the Elements, or their dissolving Power is too strong, all the attractive cohesive Force of the Particles of Matter, with which the Aliments are composed, will be destroyed; and consequently, instead of re-

taining their natural and due Consistence, will run into a frothy, hot, and windy Flatus; and this hot, flatulent Substance, not being capable to be sufficiently purged and depurated, after it has passed into the Intestines, by the Bile and pancreatic Juice, and afterward in the chyliiferous Vessels by the Lymph, must always supply the Blood with a great Quantity of hot and rarefied Particles; and therefore must be attended with all the Effects of a hot, flatulent, and acrimonious Fluid; as a great Heat and Tension of the *primæ viæ* during the Time of Digestion, great Restlessness at Night, especially after a late and Meat Supper; periodical Heats, a great Disposition to sweat, and Aptness to be overheated upon any Exercise or Motion more than common; and various other Symptoms too tedious to mention.

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THIS Irregularity of Digestion or Dissolution, generally attends those Persons who drink large Quantities of spirituous or vinous Liquors, and make Use of a great Quantity of high seasoned Food, Sauces, Pickles, &c. and use but very little Exercise; and how strong this Custom does prevail among the Beau-monde in these Days of ours, I need not mention, because every Body is a Judge. I shall only observe, that if a Person would endeavour to renounce this pernicious Custom, and pursue the serene and manly Pleasures of Temperance, Frugality, and Exercise, he must renounce almost all human Society. But it were much to be wished, that this Species of Epicures, this Species of Drones, this Generation would soon bring the World to an End, by destroying, and rendering themselves incapable of propagating

their Species ; and in short, that this Generation who are useless to themselves and others, would renounce these their momentary Pleasures, which are interspersed with Pain and Anguish, and pursue the true and serene Pleasures and Happiness of this Life, which arise from Temperance and Exercise.

BUT when there is a Defect of the natural Heat and muscular Contraction of the Stomach, and their Action upon the expansive or centrifugal Force of the Elements is too weak and low, the attractive cohesive Force of the Particles of Matter which compose our Aliments will be too great : from whence must ensue a cold and hard Digestion, as the Action of the Stomach upon the expansive Elements is not more than is sufficient to dissolve the more thin and watry Parts of the Aliments,

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those Particles, whose attractive cohesive Force, with each other is very small, while the richer Oils, and volatile Salts, contained in the Aliments, or those Particles whose Points of Contact, and consequently attractive Force, with each other, are very great, are left untouched, for Want of a proper Degree of Heat to rarefy their contained Air, and excite their fiery Particles to Action. And these volatile Salts and oily Particles, which, in a good Digestion, are the last that are acted upon and dissolved, because of their great attractive Force, are in this Case not separated at all, because the Action of the Stomach, upon the elementary Particles, is not sufficient to render the expansive or centrifugal Force superior to the attractive or centripetal Force of the Particles, but are precipitated with the Fæces down the Guts, and evacuated by Stool. Therefore, of Course,

the Blood can have nothing for its Nourishment, but the thin watery Particles of the Aliments, with a few Salts; and as these volatile Salts and oily Particles, which should be conveyed into the Blood, and be attracted by its Globules, to keep up their Warmth and Elasticity, being left undissolved by the digestive Powers, and evacuated with the Fæces, the globulous Part of the Blood, for Want of this refreshing Supply to keep up its Warmth and Elasticity, dissolves gradually into Serum, and loses its proper Quantity of Crassamentum; whereby the Circulation becomes languid, the natural Heat of the Body decreases, the Fibres lose their Elasticity and Contractions, and grow soft and flabby, and all the animal Powers will gradually decay and languish: And as the globulous Part of the Blood is deprived of its Heat and Elasticity, and consequently runs into

Serum

Serum, the Liver will receive a Fluid which abounds too much with serous Particles, to separate a good and laudable Bile; but what it separates will be near of the Nature of common Serum, and consequently will be incapable of performing its Office in the Intestines, *i. e.* of purifying the Chyle, and promoting the peristaltic Motion of the Intestines, by its warming Stimulus or natural cathartic Quality; from whence must ensue an obstinate Constipation and Obstruction of the Bowels, with a continual Nausea, Loss of Appetite, and Inclination to vomit at every Thing.

THIS Irregularity of Digestion is for the most Part the Consequence of the former, or its second State. For when the Heat and Acrimony of the Blood have been much increased, and consequently the Fi-
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bres of the Body too strongly stimulated, and immoderately stretched, by too great a Quantity of hot and acrid Fluids, being forced on them by the increased Force of the Circulation, they cannot long continue in this State of Tension, but must at last sink into this opposite State; as the attractive Force of the Particles of Matter with which they are composed is now almost destroyed.

COROLLARY.

WHEN the miserable Patient arrives to this State by his Intemperance and Luxury, his Cause is extremely dangerous, and he has only one Chance for his Life at the best, very often none at all: but what Relief may now be expected, must be from gently Emetics, and they frequently repeated, joined with a medicated opening Wine

Wine, made of the best Rhubarb and Cortex Peruvianus; and gentle Exercise: And, during the Use of these, to use a strict Regimen of Milk, Vegetables, and white Meats, carefully avoiding all Debauches, and gradually decreasing his usual Quantity of Wine and Spirituous Liquors, till he can entirely omit them all.

C H A P. III.

*Of the State of the Solids generally
causing Fevers.*

P R O P. I.

To explain the Nature and Cause of a too great Rigidity and Elasticity of the animal Fibres, and the different Kinds of Fevers which are produced thereby.

THE most simple animal Fibre consists of very small Parts, adjoining to each other length-ways: These minute Parts or Particles are held together by their attractive cohesive Force; and the attractive cohesive Force of all Bodies, is greater or less in
Proportion

Proportion to the Quantity of their Points of Contact; therefore in Proportion to the Quantity of Points of Contact in the Particles which compose the Fibre, will the cohesive Force or Strength of the Fibre be. If these minute Particles which constitute by their Union an animal Fibre, be considered as Particles, we know nothing of them, because we cannot trace Matter back to its Origin: And those who have made Attempts to discover the Nature of these Particles, and the Diseases they are liable to, have been always groveling in a State of Obscurity, and knew no more of it when they left of, than when they began.

THAT these Particles are endued with an attractive cohesive Force we all know, and that they may break off from one another, and lose, in a great Measure, their cohesive

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five Force, is what we may easily conceive; but as Matter continues to have the same Laws from the Beginning of the World to this Day, it appears highly probable that the minute Particles of all Bodies are unchangeable. Therefore the most simple Diseases of the Fibres are not to be deemed a Default of the Particles with which the Fibres are composed, but from their different Cohesion, or the uniting of these together; so that too great or too little a Degree of Cohesion of the Particles of Matter which compose the Fibres, may cause too great a Rigidity, or Relaxation of the Vessels, and Viscera formed by them; and these may give Rise to a great Number of Diseases: Those which proceed from too great a Degree of Cohesion, or Rigidity of the Fibres, we are now about to treat of.

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Our Life and Health do entirely depend upon the Fibres having a proper Degree of Tensity, consistent with a due Proportion of Flexibility, that every Vessel which those Fibres compose, may be so pliable as to be distended by the Blood which is forced into it by the Force of the Heart, and at the same Time to give a proper Resistance to that Fluid, by their Springiness and Elasticity, to keep its Parts duly fluxile, and in a proper Degree of Motion. But when the Vessels are too rigid and dry, there must immediately follow,

FIRST, A less Flexibility of them; consequently they cannot be dilated so easily as in Time of Health.

SECONDLY,

SECONDLY, Their Diameters are decreased; as their Sides contract towards their Axis.

THIRDLY, It follows of Course, that they will give too much Resistance to the Fluids thrown upon them by the protruding Force of the Heart.

FOURTHLY, A less Quantity of Fluids will pass through them, than in Time of Health: Consequently the Dilatation of the Heart and Arteries will be decreased, and the Secretions lessened.

FIFTHLY, The most thin and fine Parts of the Fluids, by this State of the Vessels, are evacuated, and consequently the remaining Mass will be rendered more thick and viscid: Whence proceeds too great a

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Waste

Waste of the nutritive Juices, which must end in a Fever, which will be perpetual, an Atrophy, or a compleat Marasmus.

THE Fibres of the Body may be known to be in this State, by the Flesh of the Patient feeling very rough, hot, and dry; by the Smallness and Quickness of the Pulse; by the Tongue being extremely dry, and, as it were parched; and by a very hot and quick Breathing: For when the Vessels of the Lungs are too much contracted, and too rigid, they cannot dilate and contract as frequently as in the Time of Health, without great Pain and Uneasiness; consequently the Circulation of the Blood thro' this Organ, and the Reception and Protrusion of the Air, on which Life depends, cannot be performed without some Difficulty.

COROL.

COROLLARY.

THIS State of the Fibres may be relieved by the Use of a thin watry Diet, very soft emollient Herbs, mealy Substances diluted and unfermented; by Rest and long Sleep, especially in a cool and moist Air; by watry Medicines externally applied, and these in a luke-warm State; by proper and frequent subtepid Bathing, more especially if the Season is cold and dry.—When Persons of this Constitution fall into Fevers, they will always be of the inflammatory Kind, as acute continual Fevers, Pleurifies, Peripneumonies, or the like: And in this Case I should always advise a great Quantity of warm, emollient, diluting Liquors, to be continually taken by the Mouth, and cast up by Clyster, and at the same Time warm emollient Fomentations

should be applied to the Feet, Legs, Arms, Hands, and Hypochondria; as these will be found to have surprizing Effects in such Cases: By these the Blood will be effectually diluted and the Fibres relaxed, and likewise by the Vapour of these warm Liquids the Vessels of the Lungs are relaxed, and consequently the Blood must have a more free Passage through them; which will soon be followed with a copious and free Expectoration.

PROP.

P R O P. II.

To explain the Nature and Cause of a too great Weakness and Relaxation of the animal Fibres, and the different Kinds of Fevers produced thereby.

WE have observed, in our last Proposition, that an animal Fibre consists of very small Particles of Matter, which adjoin to each other length-ways, by that attractive cohesive Force which is found to unite all Bodies together; and that in Proportion to the attractive cohesive Force of these minute Particles will the Strength or Weakness of the Fibre be. We have likewise, in our former Proposition, pointed out that Degree of Cohesion of these Particles, or Strength of the Fibre, which is necessary to keep the Body in a healthful State, and

likewise that Degree of Cohesion which brings on too great a Rigidity and Elasticity of the Fibre, with the Effects produced by this Cause; and it now remains for us to resolve this second Proposition, *i.e.* to explain the Nature and Cause of too great a Weakness and Relaxation of an animal Fibre. The Weakness of a Fibre proceeds from the Union of its Particles with too small a Degree of Cohesion, or by so few Points of Contact, that they are capable of being disunited by a Motion which does not much exceed that which is the Effect of Health; very often even that will disunite them.

WE have plainly shewn in our former Propositions, that the Vessels of our Bodies, which are composed of these Fibres, should always yield to the Force of the Circulation, and be distended by their contained

tained Fluids ; but then these Vessels, by the Strength and cohesive Elasticity of their Fibres, should give a proper Resistance and Degree of Motion to their contained Fluids, so as to keep their Parts duly fluxile, to perform the natural Functions of Life. Hence therefore the Fibres of the human Body are said to be too weak, when they are rendered incapable, without doing Injury to their Cohesions, of sustaining that Motion, which is requisite for the Exercise of the Functions of the Body, in the Time of Health. If the Fibres had such a Degree of Strength, and would sustain that Motion which is requisite in Health for the Exercise of the natural Functions, it would not be sufficient to keep the Body in perfect Health ; for the Fibres should sustain a much greater Force and Quantity of Motion, otherwise the Body cannot subsist. When the minute Particles, which

constitute the Fibres, cohere with no greater Force, than what is requisite to sustain the Motions of the Fluids through the Vessels when Nature is calm and serene ; their cohesive Force will be immediately destroyed when the Velocity of the Fluids is increased ; which must certainly be the Case very often, notwithstanding our greatest Precaution, and then Death must be the Effect.

It is a certain Fact, that these minute Particles of the Fibres consist of the Things we are nourished by ; but then this is equally certain, that this Matter must undergo a proper Preparation by the animal Functions before it can be assimilated into our Nature, and restore what has been rubbed off from the Fibres, by the Motions of the Body. Therefore these Particles may lose their attractive Force
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by the Nature of the Aliment with which they are formed, or by this Aliment not undergoing a proper Preparation in the Body, before it is applied to Nourishment.

THE Effects of too great a Weakness and Relaxation of the animal Fibres are,

FIRST, A very easy Extention of the Vessels, composed of these weak Fibres; whence a Deficiency in the Strength or Force of the Action of the Heart, Lungs, and Arteries.

SECONDLY, Their Rupture, or sluggish Motion on their contained Fluids; consequently, Tumours must arise from the Pressure of the Fluids; intestine Motion and Putrefaction, from their Stagnation or Extravasation; a Viscidity of the whole Mass, for want of a proper Degree of Motion

and Attenuation; and a disuniting of the serous Part of the Blood from the globular: Nor is the Chyle sufficiently assimilated into Blood.——Hence irregular Concretions in the Vessels, a Lentor or Viscidity in the Serum and Lymph, a small Quantity of the nervous Fluid, and all the other Secretions weak and imperfect: And consequently there must follow Cachexy, intermitting and remitting Fevers, which are very irregular, or those Fevers commonly called Nervous: For when the Fluids of the Capillary Vessels have not a proper Degree of Motion from their containing Vessels, they immediately grow viscid, and form Obstructions in these Vessels; and it is a well-known Axiom that all the Humours of the human Body, when they have not a proper Degree of Motion to keep their Parts duly fluxile, and maintain their Elasticity, begin to have an intestine

testine Motion, and corrupt, and soon after grow acrimonious; and very often to that Degree as to bring on Fevers of the worst Kind, commonly called Malignant: For though the Circulation may be very languid from the Weakness of the Fibres, yet it is sufficient to give the Fluids a Degree of Heat that will so rarefy their included Particles of Air and Fire, as to cause an intestine Motion within themselves; whence must follow a feverish Heat from their stimulating Acrimony, and in the End a general Putrefaction.

THIS State of the Solids is relieved by a very nutritive Diet, which is very easy of Digestion; by gentle Exercise, as riding on Horse-back or in any Kind of Vehicle, Walking, Sailing, and all Kinds of Exercise, which gently increase the Motion of the Solids and Fluids; by Friction; by a

gentle Compressure of the Vessels, and a moderate repelling of their contained Fluids; by such Medicines as increase the Excretions by Urine, or insensible Perspiration, thereby lessening the Quantity of the Lymph and Serum in the Body; and by such Medicines as brace the relaxed Fibres, *i. e.* such as will bring the Particles which compose the Fibres to adhere by a greater Number of Points of Contact, and consequently a stronger Cohesion: And these are such as have in their Composition a great Number of Particles of elastic Air and Fire; for these, when received into the Body, do immediately cause a gentle Fermentation in all the Fluids, by the Elasticity of their contained Particles, being excited to Action by the Warmth of the Body; whence must immediately follow an increased Degree of Warmth in the Body, by the Particles of the Fluids being
strongly

strongly agitated by the rarefied Air, and Particles of Fire contained in the Medicine: and consequently a Rarefaction of the Blood-Globules, by which they absorb a greater Quantity of its Serum than they used to do, and by so doing its Texture will be strengthened, and the whole Mass rendered incapable of entering into Vessels undesigned for its Reception, commonly called Error of Place ; and thereby cannot obstruct or lay a Load upon any of the elastic Vessels of the Body; whence its Fibres must be gently contracted, by the agreeable Warmth and Stimulus given them by this Fluid in all Parts of the Body. Of this Class of Medicines may be reckoned all Aromatics, Chalybeats, and Acids.

CHAP.

strongly agitated by the heated Air, and
particles of Fire contained in the Medi-
cine: and consequently a Retention of
the Blood-Globules, by which they absorb
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used to do, and by so doing its Texture
is so changed, and the Globules
retained incapable of entering into Vessels
intended for its Reception, commonly
called Sinus of Place: and thereby cannot
obscure or lay a Load upon any of the
static Vessels of the Body; whence its Fi-
bren must be gently contracted, by the
Tension of the Arteries, and thereby again
be brought into its former state of Relaxation.
Of this Class of Medicines may be reckoned
all all Astringents, Chalybeates, and Acids.
The Fluids of the human Body
should always be kept in a soft and
free of Motion, so as to keep them
from being too much constricted one

Caution

C H A P. IV.

*Of the general State of the Fluids
causing Fevers.*

P R O P. I.

*To explain the Nature and Cause of a too
great Velocity of the animal Fluids and the
Fevers caused thereby.*

THE Fluids of the human Body
should always be kept in such a De-
gree of Motion as is necessary to keep their
Parts duly fluxile, so as to constitute one
uniform

uniform Fluid. But if this Degree of Motion is increased, it must immediately disorder the whole Mass, and Diseases must ensue; the Cause and Effects of which we are now going to treat of.

THE increased Velocity of the Blood, through its containing Vessels, arises from the quicker and stronger Contractions of the Heart and Muscles; and the quicker and stronger Contractions of the Heart and Muscles arise from whatever increases the Quantity or Acrimony of the Blood; and likewise by whatever increases its Heat and Rarefaction. The Quantity of the Blood is increased by an Obstruction of any of the natural Evacuations, when at the same Time the Blood is nourished as before with a good and laudable Chyle; whence must arise a quicker and stronger Contraction of the Heart, as that Spring

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of vital Power has a greater Quantity of Fluids to protrude through the Arteries, and consequently must increase its Contractions, or let the Blood be accumulated upon its Ventricles, and immediately sink under the Burthen. The Contractions of the Heart being increased, the Velocity of the Blood through its containing Vessels must likewise be increased, and consequently its Heat; whence the Contractions of the Muscles will be likewise increased; and by these being increased, the Blood-globules will become more dense and in greater Quantity, the Vessels more strong and elastic, and consequently their Action upon the Fluids will be much increased; whence of Course great Friction, and much Heat will be generated, which both dissipates the more fine lymphatic Parts of the Blood, and increases its Velocity; whereby that

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Fluid

Fluid becomes much more glutinous, and of Course unfit to pass the minute Branches of the capillary Arteries: And hence arise inflammatory Fevers of all Kinds.

THE Acrimony of the Blood may arise,

FIRST, From the foregoing Causes long continued; for by these the Blood will at last become acrid, by its violent Heat, which develops all its volatile Salts, and sets them at Liberty to act on its other constituent Parts; whence must arise this Dissolution and Acrimony.

SECONDLY, By mixing some acrid Matter with the Blood, whether of an aromatic, saline, ichorose, or alkaline Nature; for when the Body is in perfect Health, our Humours are mild, (as the Blood of a Person in Health being dropt into the Eye
will

give no Pain) and like to a fine Balsam, and the Circulation is then most serene and equable: But when any acrid Matter is mixed with this Fluid, it immediately begins to prey upon its globular Part, as being endued with the greatest attractive cohesive Force, and consequently attracts this Matter the most, first destroying the Elasticity of these Globules; and secondly dissolving their constituent Parts, and making them mix with the Serum, — Hence must immediately arise great Confusion in the Body; for the active and saline Particles of the Blood, being now disunited from the rest of the Mass and set at Liberty, begin to stimulate the internal Coats of their containing Vessels; and thereby increase their Action upon the Fluids, and consequently their Velocity; and by their Velocity being increased, their Heat will likewise be increased, and a Fe-

ver raised; which will be of the putrid Kind, commonly called malignant; and will be greater or less in Proportion to the Strength of the Texture of the Mass of Fluids. For when the globular Part or Crassamentum of the Blood is entirely dissolved, by this acrid Substance, (as is very often the Case) and this Fluid rendered a dirty Puddle of acrid Matter, the Fever then caused will not be attended with as great a Degree of Heat as otherwise, but will for the most Part be attended with, either a Mortification of some principal Part, an Eruption of black or livid Spots, (which are, in short, Mortifications) or very profuse and dangerous Hæmorrhages. The dissolved Crassamentum then, forced by the Power of the Heart and Arteries into capillary Vessels not designed for it's Reception, is the occasion of those livid Spots

Spots on the Skin; but if the Force of the Heart and Arteries be strong enough to break the containing Vessels, an Hæmorrhage must ensue, greater or less, in Proportion to the Magnitude of such Vessels, and Quantity of Acrimony of the Fluids therein contained.

AND thirdly, the Acrimony of the Blood may arise from a volatile Matter being mixed with it, of the contagious, pestilential, or poisonous kind. This contagious Matter, to us, appears to be nothing else than a volatile Effluvia, which passes off from the infected Body, and is composed of the most volatile saline and oily Particles of that Body, which, by the dissolution of its Particles is developed, and set at Liberty, and composes a Kind of natural Sapo, or Solvent. This active volatile Matter, being attracted by the circumambient Atmosphere, may

be conveyed, with the Current of Air, to Places very distant from the infected Bodies, and then be drawn in with the Breath of Animals; and in the same Species of Animals which it arises from, it produces the same Dissolution of their Fluids, as was that from whence it arose: It never disorders an Animal of a different Species, because the Texture of the Fluids of all Animals is different, and every Kind of Matter whatever is most easily attracted by that of its own Kind (this is a known Fact) therefore we may conclude that this volatile Sapo will always be attracted by those Particles of Matter, which are of the same Nature and Texture of those from whence it was developed, and by the expansive Force of its contained Elements, forced into its sphere of Repulsion, and consequently its Particles very minutely divided. This volatile Matter, when received
into

into the Body with the Air, is immediately attracted by that Part of the Fluid from which it was set at Liberty, *i. e.* the Blood-Globules; and immediately as being a natural Solvent, destroys their Elasticity, and brings them to a State of Diffolution, by the Fermentation it excites in their contained Substance; and very soon follows a Train of the same Kind of Symptoms which happened to the Body from whence this Matter arose; and thus is Contagion propagated, in every different Species of Animals.

S C H O L I U M.

THAT Contagion is propagated by the Means we have just now described, may be plainly proved from the following Observations.

P 4

I. WHEN

I. WHEN a Person, in sound Health, happens to receive into his Body some of the volatile Effluvia which passes off from another Person ill of the Small-Pox, although, very often, he is at some Distance from the Person infected, immediately his Blood becomes rarefied, from the Fermentation which is caused in its Globules; and a gentle Fever will be raised; and as the Globules become more dissolved, they cause an Acrimony of that Fluid, as we have proved before, whence a violent Fever; and as the volatile active Particles of that Fluid contained in the Globules, attract this contagious Matter with the greatest attractive Force, it must be mixed and united with them, and these being the most fine and volatile Parts of this Fluid, and consequently when developed and set at Liberty, are the most easy to be protruded
to

to the Surface of the Body, wherethey are, by the Force of the Circulation, forced into the minute Vessels, with such a Veloeity as greatly distends them, even to raise them above the Surface of the Skin, in the Form of Pustules: And, immediately after, the Fever ceases, although it continues in a small Degree for some Time. As this volatile Matter does not act upon all the Globules at once, there will consequently be still some Degree of Fever 'till the whole Mass has been vitiated, and then the Fever entirely ceases, and the Small Pox is, as they term it, at the Height. Then the Circulation begins to grow more languid; and as the protruding Force of the Heart decreases, the Resistance the Fluids give to the Contractions of the vessels will likewise decrease, and of Course some of this protruded Matter will be, by the Contractions of the Vessels, forced again

again into the Mass of Fluids, whence a new Fever arises, commonly called a Secondary Fever, which continues 'till the Mass of Fluids is cleared of this putrid Matter.

It has likewise been found by Observation, that every different Kind of Animals are liable to different contagious Diseases, which very seldom, if ever, affect others.—The contagious Matter which is the Cause of the Plague, has very often been found to be strongly attracted by Cotton, Wool, Linen, Silk, spongy or porous Wood; because the Particles of which compose such Bodies are very large in their Surfaces, in Proportion to their Densities, and consequently have a very great attractive Force. Here the contagious Matter becomes inactive, because of the Body's coldness which cannot give it such a Degree

a Degree of Motion as is requisite to destroy its constituent Particles ; but when this is applied to the Body of a Man, it immediately loses its Contact with the other Bodies, and flies to that, and particularly to the globulous Part of the Fluids, as this has the greatest attractive Force of any Part of the human Body, where, by the Warmth and Motion of the Globules, this Matter is rendered active, and very soon destroys their Texture and Elasticity, brings on a violent Fever, and quickly kills the Patient ; except this Matter can, by violent active Medicines, be forced to the extreme Parts of the Body.

PROP.

P R O P. II.

To explain the Nature and Cause of a too languid Circulation of the animal Fluids, and the Fevers caused thereby.

A too languid Circulation of the animal Fluids may arise from,

1. A RELAXATION of their containing Vessels; whereby they cannot have a proper Degree of Motion.

2. FROM a Plethora, or too great a Quantity of good Blood; *i. e.* such a Quantity as the Vessels cannot render capable of undergoing those Changes, which are necessary for animal Secretion, without causing Diseases; consequently the Vessels will be loaded, their Action upon the

the Fluids decreased, and a too languid Circulation caused thereby.

3. By the Fluids being nourished with a cold, heavy, viscid Food. For the Fluids contained within us are either crude, and retain in Part the Nature by which they are nourished: or, by the Action of the digestive Powers, they have already acquired the Properties which belong to human Fluids. If therefore the Aliments by which our Fluids are nourished, be such as are commonly called hard of Digestion, or whose Particles of Matter strongly adhere together, then the digestive Powers will not be able to break small enough their Particles, to render them capable of entering into the minute Passages of the Body; consequently the glandular Secretions will be decreased, and the Fluids rendered more gross and dense, where-

by their Velocity will be much decreased, and immediately Diseases follow; the Nature of which we are now going to treat of. *The Fluids being nourished with a cold, heavy, viscid Food. For the Fluids*

And first, when the Action of the Vessels upon their contained Fluids begins to decrease, the Digestions decrease likewise; the most rich Oils and volatile Salts contained in the Aliments remain undissolved, and the Blood is nourished only with their most thin and watery Parts; hence the globular Part of that Fluid will be decreased, and likewise too loosely cohering; and its serous Part becomes too watery and vapid, and sometimes grows viscid. From this State of the Fluids all the Secretions become imperfect, and not sufficiently participant of an animal Nature; the Bile becomes inert, and like the Serum of the Blood; the nervous

Fluid

Fluid more gross and viscid; the Saliva a mere viscid Mucus, and all the rest of the glandular Secretions, in Proportion to these, inactive and viscid. From whence arises a universal Indigestion, Paleness, Coldness, and Cacochymy; and in short such a languid Motion of the animal Fluids, that they at length, fall into intestine Motions and Acrimony, for want of a proper Degree of Motion. Whence arises such a Degree of Acrimony as to end frequently in Fevers of that Kind which are commonly called Nervous. — But if the Corruption and Acrimony of the Fluids are very great, this State frequently ends in that Fever which is commonly called the miliary Fever and is very often attended with dangerous Consequences.

SECONDLY, when there is too great a Quantity of good Blood produced in the Body, the Vessels will be distended or loaded whereby

whereby their Action upon their contained Fluids, will be greatly decreased. Too great a Quantity of good Blood is commonly called a Plethora, and consequently, if the Body is not otherwise disordered, cannot be called a Disease: And when we say a Man is plethoric, we do not understand by that, the Existence of any Disease, but that he is so full of Fluids, that if their Quantity be farther increased by any accidental Cause, or these Humours rarefied by any Cause, except there are immediate Evacuations, their Resistance against their containing Vessels will be so great, as to endanger a Rupture, or distend them so far as to weaken their Springs, and Action upon their Fluids; and the Fluids, when the Action of the Solids upon them is abated, immediately decrease their Motion, fall into intestine Motions, and grow acrid, whence arise Fevers, to which Physicians give

give the Name of Compound Inflammatory. Thus, a Person who is plethoric may enjoy a good State of Health, and be free from the least Ail, but then this Person is always in Danger of being attacked with a violent Disease; for by the Increase of Heat in the Atmosphere, by the least Irregularity in the Non-naturals, by indulging any violent Passion, or, in short, any thing which encreases the Velocity or Rarefaction of his Fluids, he is immediately thrown into a raging Fever; and it is almost impossible to guard against, or prevent such unforeseen Accidents, from happening to the most healthy, except it be by evacuating the superabundant Quantity of Blood.

---A Plethora is caused by whatever produces a large Quantity of good Chyle and Blood, and at the same Time lessens the Quantity to be secreted by the Glands.

Q

Thirdly,

THIRDLY, The Blood being rendered more languid by the Viscidity and Density of the Aliments, there is immediately produced in the Primæ viæ, a Sense of Fullness, Loss of Appetite, Indigestion, Costiveness and a swelled Belly: In the larger Vessels this Fluid contracts a Viscidity and Lensor, and is thereby rendered incapable of passing through the minute Vessels of the Body, through which it ought to pass; and in these minute Vessels it produces Obstructions, Concretions, and at last destroys the Action of all their Glands, and gives Rise to a White Swelling. The Urine is now pale and thin, and all the Secretions greatly retarded, especially those which secrete the most subtile Liquids; whence all the Concoctions, Secretions, and Excretions of the Fluids are disordered; the
Fluids

Fluids fall into intestine Motions for want of a proper Degree of Motion, and the Tendency to a spontaneous Corruption is universal; the Person has now very foetid Belchings, and gnawing at the Stomach; the Pulse is now very irregular, and the vital Motions are entirely disordered; as appears by the great Difficulty of breathing upon the least Motion; the great Anxiety, Palpitations of the Heart, and Swooning, and that upon the slightest Occasion; the depressed Pulse, whilst the Patient remains quiet and inactive; and the irregular and intermitting one, upon the least Degree of Motion. The Humours now begin to grow acrid, and the Patient has a præternatural longing for extravagant Things; chiefly those of the absorbing Kind, as Chalk, Earth, Ashes, &c. which Girls in this Disease do very often swallow down in private, and from whence arise most mis-

able Diseases: And when the Humours begin to grow putrid, a fever is generated, which for the most Part sends the Patient into the other World.



CHAP. V.

Of a simple continued inflammatory Fever.

PROP. I.

*To explain the Nature and Cause of a Simple
continued Fever, and the Effects produced
upon the Body thereby.*

A SIMPLE continued inflammatory Fever, is a Fever of two, three, or four Days Continuance, or some times longer; and seldom attended with any dan-

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gerous

gerous Consequences, except neglected, or ill treated; is occasioned by whatever increases the Action of the Solids upon the Fluids, and the Re-action of the latter on the former; as obstructed Perspiration, or the lessening of the Quantity of any of the other Evacuations; by which the Equilibrium between the Force of the contractile Solids and the circulating Fluids will be broke; as by the Fluids being increased in Quantity, the Heart will be obliged to redouble its Contractions, to protrude the increased Quantity of Fluids thro' the Arteries, and by the Contractions of the Heart being increased, the Velocity of the Blood through the Arteries will likewise be increased; and consequently, by its Attrition against the Sides of the Vessels, a greater Degree of Warmth will be generated in that Fluid; whereby its aerial Particles will be rarefied, and its Globules distended,

ed, and rendered incapable of passing freely the small Vessels they used to pass through ; whence arise Obstructions of those minute Vessels, and thereby an increased Quantity of Fluids in the larger Vessels ; which being driven on with a violent Impetuosity through their Tubes, and having an increased Degree of Heat, (the Consequence of this impetuous Motion,) by both these, the Fibres will be strongly irritated, their Motions or Contractions increased, and this Fever generated. Its Effects are, first, a Sense of Cold, Shivering and Trembling ; which are soon succeeded by Heats, Pain in the Head, or other Parts of the Body, and a strong quick Pulse ; these are soon succeeded by a great internal Heat, which diffuses itself into the extreme Parts of the Body ; a great Thirst, Difficulty of Breathing, and Restlessness : a Loss of Appetite, and

a general Nausea and Reluctancy of the Stomach against every thing but thin diluting Liquors.

PROP. II.

To explain the Method of allaying those Symptoms, and entirely eradicate the Disease.

By considering the proximate Cause of this Disease, the Method of Cure for it is very obvious, which is by lessening the Velocity, Quantity, and Acrimony, of the Fluids, and thereby the increased Contractions of the Solids will decrease; all which are known to be the Cause of this Disease. And to answer this, no Method, which has yet been discovered, exceeds the following.

BLEEDING.

BLEEDING is to be immediately used, as nothing so soon abates the too great Velocity, Quantity, and Heat of the Blood as Bleeding. This should be done on the first Days of the Disease, because the longer Evacuations, of which this is the principal, are neglected, the more viscid and acrimonious will the Blood be rendered, by dissipating its more thin Particles, condensing the globular Part, and rendering the ferous Part much more viscid; and by continually exalting the animal Salts and Oils to a greater and greater Degree of Acrimony. The Quantity of Blood to be taken away must be in Proportion to the Strength of the Patient, and Violence of the Symptoms; and, if there be Occasion, it may be repeated.

THERE

THERE are some particular Symptōms which we cannot forbear observing here, as we have been deceived by them several Times, and insert them as a Caution for others; which are an Oppression of the Pulse, with Coldness, and Faintness; which very often attend this and other inflammatory Fevers, in the Beginning; and are occasioned by the super-abundant Quantity of Blood in the Vessels, which loads them, and renders the Fibres inactive; we have often found this the Case, and, notwithstanding the Faintness and Oppression of the Pulse, have immediately ordered a large Quantity of Blood to be taken away; and afterward the vibration of the Artery became more strong and free, the Faintness immediately vanished, and a great Heat began to diffuse itself all over the Body, which before was cold. Very soon

soon after bleeding, if the Patient is sick at Stomach, or has any Reachings, he should have a gentle Vomit of Vinum Ipecacoanhæ, or the like, to cleanse his Stomach, and should drink plentifully of thin diluting Liquors. But if he finds no Uneasiness at his Stomach, immediately cast up a Lenient Clyster, to empty the Bowels of their Contents, which may be repeated once every two Days. The Day after Bleeding, if the Symptoms are not greatly abated, he may take the following Medicine in proportion to his Strength and Age: The following Recipe is calculated for a strong Adult.

R. Sperm. Ceti (in q. s. Vitel. ov. solut.)
3ss; Sal. Nitri ʒj; Aq. Alex. Simpl. ʒiss;
Tinct. Cast. Rus. g.t xi; Syr. Bals. ʒiij. M.
f. haust. omni Triborio sumend. Superbibend.
haust. Theæ Melissæ.

Br

By this Method a natural and regular Crisis may in due Time be expected, which may be known by some or all of the following Appearances,

1. A SENSIBLE Abatement of the Heat and Thirst, with a beginning Moistness and Lubrication of the Salival Glands.

2. A MUDDY Urine, with a Sediment or Separation of its Parts upon standing.

3. An easy, cooling Diaphoresis, or Sweat which will very often be viscid and foetid.

4. BLACK, viscid, tenacious, or otherwise discoloured stinking Stools.

5. THE Pulse during these Discharges becomes very regular and natural.

AND

AND as soon as the Crisis or Solution of the Fever manifestly appears by these Symptoms, we should immediately order the Patient some cooling Cathartic, to cleanse the Bowels, and carry off any of the hot acrid Matter which may have been thrown thereon, for which I would recommend such as the following.

*R. Mannæ opt. ℥j; Juscul. Avenac. ℥ij;
M. f. Solutio. Cui adde Pul. Rhab. Sal.
Diuretic aa ʒss; M. f. haust. Cathart. Mane
cum Regimine sumend.*

C H A P. VI.

*Of an acute continual inflammatory
Fever.*

P R O P. I.

*To define the Nature and Cause of an acute
continued Fever.*

IN our foregoing Chapter we have defined the Nature and Cause of a simple continued inflammatory Fever, and now we are about to define the Nature and Cause of an acute continued Fever, which is of the same Nature with the former, only the Heat, Velocity, Acrimony, and inflammatory State of the Blood are much greater

greater ; its fine balsamic Particles more diffipated ; its red Globules more condensed ; its serous Part heated to such a Degree as to turn it into a kind of Jelly ; and its Salts and Oils exalted to a very great Degree of Acrimony : And when the Fever continues any Time, the whole Mass grows acrid and unfit for animal Uses. Besides this, there are very often Obstructions in the small capillary Arteries and lymphatic Vessels, formed by the dense Globules being forced into those Vessels, undesigned for their Reception, commonly called *Errore Loci*, whence Inflammations and Ruptures of the Vessels frequently follow. The Antecedents of this Fever are,

1. AN extreme cold Air ; by which Perspiration is obstructed, the Fibres too strongly braced, and the Fluids congealed in the capillary Vessels, lying in the external

external Parts of the Body, which increases gradually to the larger Vessels: Whence arises this Fever, from a Plethora, and Lensor of the Fluids in the capillary Vessels.

2. A VERY hot Air; by which the Particles of Air contained in the Blood are rarefied, and consequently its Globules distended, and its fiery Particles excited to Action; and thereby the Crassamentum and serous Parts of the Blood will be brought to a Union and Cohesion with each other; and, consequently, when the Crassamentum and serous Parts of the Blood are brought to coalesce, the Course of the Serum thro' the serous Vessels, and the course of the red Blood thro' the sanguine capillary Arteries will be difficult and slow, and the Motion of this Fluid through the larger Arteries, thereby much augmented, the

R Friction

Friction of its Globules against the Sides of the Vessels, and consequently its Heat and Rarefaction much increased: by which, except there is immediate Relief, the Texture of the Globules is quite destroyed, by the expansive Force of their contained Air; its Salts and Oils are exalted to a very great Degree of Acrimony, and at length the whole Mass is rendered an acrid Puddle of corrupt Matter.

3. DRINKING too great a Quantity of spirituous or vinous Liquors, or using too great a Quantity of acrid Sauces; by these the Fibres of the Body will be greatly stimulated, and of Course their Action upon the contained Fluids greatly increased, by which their Velocity, Friction, and Heat, will be much augmented, and their contained Particles of Air greatly rarefied; whereby a Fever will be raised, as we have observed before.

4. IMMO-

4. IMMODERATE and violent Exercise. For notwithstanding gentle Exercise is so beneficial to the Body, for promoting the glandular Secretions, and giving a proper Degree of Motion to the Fluids ; yet when the Action of the Solids upon their contained Fluids is raised to its highest Pitch, by violent Exercise, and continued in this State for some Time, the Motion of the Fluids will be increased to that Degree, as to raise a Fever, by the great Friction there is between the Solids and Fluids rarefying the aerial Particles of the latter : Which violent Motion of the Fluids will sometimes rupture their containing Vessels : From this Rarefaction a great Quantity of the serous Parts of the Blood will be attracted by and united with the globulous part and consequently the Mass made to possess a larger Space than usual, and likewise ren-

dered more thick and viscous; and if this violent Motion of the Fluids is continued, it at last so volatilizes the Salts and Oils of the Blood as to entirely dissolve the whole Mass, and render it putrid. We should likewise observe, that when Persons are heated to this Degree by violent Exercise, they are very desirous of cooling themselves; and to answer which, they injudiciously drink large Quantities of cold Liquors, or expose their Bodies to the cold Air, by putting off their Clothes, &c. whereby the perspiratory Glands will be obstructed, and the Fluids congealed in the minute Vessels upon the Surface of the Body; which, joined to the fore-mentioned Causes, do produce a Fever of the most acute Nature.

5. A SUPPRESSION of any of the natural Evacuations; for by these the Quantity of the

the Blood is increased, and the Fever raised by a Plethora, as we have observed before.

6. Too much Watching; for by this, and likewise sitting up at Nights, is the Quantity of the expurgatory Secretions much increased, and the Fibres rendered too stiff and rigid; whereby the Blood will not only be robbed of its fine balsamic Parts, secreted by the lymphatic Glands, and afterwards united with it again, but its Velocity will be increased, by the Action of the Fibres being increased, whereby the Mass will soon be rendered very acrid, and a Fever be raised,

7. HUNGER and Thirst; for the Office of the Chyle separated from the Aliments is to cool and dilute the Blood, as well as to afford Nourishment to the several Organs of the Body. Therefore if the Blood

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is

is robbed of this cooling and diluting Liquor, it must soon grow dense, acrid, hot, and alkaline; and consequently be rendered incapable of supplying the several Functions of Life; whence must be raised, very soon, a Fever, from a Heat and Acrimony of the Fluids; which, if not immediately relieved, must render them putrid, and end in Death.

FROM what has been said we may deduce the following Corollaries, to prove the immediate Cause of this Disease.

COROLLARY I.

THAT an increased Quantity of the Blood alone, may increase its Velocity; its increased Velocity increase its Friction, Heat, and consequently a Rarefaction of its aerial Particles; that these, in Conjunction, may increase the Vibrations of the
Fibres

Fibres, distend the Blood Globules, and thereby render them capable of attracting and retaining a greater Quantity of Serum than they used to do.

COROLLARY II.

THAT by these the whole Mass will be rendered more viscid, and incapable of passing the minute Vessels, or ultimate Branches of the sanguine and lymphatic Arteries, and thereby will Obstructions be formed; that by these Obstructions will the Quantity of Fluids be more increased in the larger Vessels, and consequently the Heart be obliged to increase yet more its Contractions; and all the foregoing Causes be increased.

COROLLARY III.

THAT by these Causes will the Salts and Oils of the Blood be so far exalted as to greatly increase the Acrimony of this Fluid, and at last the entire Dissolution of its Globules, its Putrefaction, and the Death of the Animal.

COROLLARY IV.

THAT when the Fluids are rendered hot and acrid, by their being robbed of their Supply of cooling balsamic Liquids, their Dissolution, and the Death of the Animal, will much sooner be performed, than when they grow acrid and dissolve by the forementioned Causes.

PROP.

P R O P. II.

To describe the Effects of an acute continual Fever upon an animal Body, or the Rise of the most usual Symptoms incident to the Disease.

1. THIS Fever is ushered in with a Coldness, Chillness, and Trembling; the Pulse are now low and slow.

2. THIS Coldness and Trembling is soon succeeded by a violent Heat, a large, quick, and full Pulse, and Difficulty of Breathing.

3. SOON after follows a great Thirst, great Pain in the Head or other Parts of the Body, a Sense of Weariness and Heaviness, with an Aversion to all Kinds of Aliments except thin diluting Liquors.

4. THE

4. THE Tongue becomes dry, rough, and black; the Skin feels dry and hard, and the whole vascular System seems to be too elastic and tense; the Urine is Flame-coloured, and without any Sediment.

5. THE Patient becomes very restless and delirious, and has very often convulsive Motions, or Spasms, of the Muscles.

THESE are the Effects of an acute continual Fever upon the Body; the Cause of which we will now endeavour to demonstrate in as clear a Manner as possible.

1. THAT Coldness and Trembling which happen to Persons in the Beginning of this Fever, is occasioned by an Obstruction of the Blood's Motion through the Capillary Vessels of the Body, or in the ultimate Branches

Branches of the sanguine and lymphatic Arteries; and these Obstructions always arise from the Diameter of the Blood-globules, or obstructing Matter, being increased; for when the Blood-globules are distended by the Rarefaction of their contained Air, and thereby attract and retain a greater Quantity of the serous Part than they used to do; their Diameters must be enlarged, and of Course rendered incapable of entering into these minute Vessels; whereby the Quantity of the Blood must be much increased in the larger Vessels, and for a small Time, till the Force of the Heart can overpower the redundant Load, the Body will be cold, and the Pulse weak and slow.

2. THIS Coldness and Trembling is soon succeeded by a great Heat, and a strong Pulse; for the Course of the Blood being
more

more and more retarded in the ultimate Branches of the Arteries, and accumulated in the larger Arteries, the Circuit of the Blood will be much shorter, and its Return to the Heart much quicker, by which that Spring of Life will be obliged to increase its Contractions, and consequently protrudes the Fluids through the Arteries with a greater Force, and Quickness, and thereby the Friction of the Fluids against their containing Vessels will be greatly increased, and likewise the Action of the Vessels upon the Fluids; whereby the Pulse will be raised and a great Heat succeed.

3. Soon after follows a great Thirst, &c. When the Velocity of the Blood is greatly increased, its Globules distended, and its ferous Parts strongly attracted, and retained, thereby; not only the Discharge by the

the salival Glands, but all the glandular Secretions, will be greatly decreased. As, First, the Blood-globules strongly attract and retain a very great Quantity of the serous and lymphatic Parts. And, Secondly, its Velocity is so much increased that the serous Parts, yet at Liberty, have not Time to enter the Glands. The great Pains and Sense of Weariness do arise from the Vessels being greatly distended with a very hot Blood, by which they are very strongly pressed and irritated; and the Aversion to all Kinds of Aliments, except thin diluting Liquors arises from the great Heat, and the Fibres of the Body, being, as it were, parched; and thereby is such a Sensation conveyed to the Mind that every thing is dreaded that tends to increase the Heat of the Fluids, or Contractions of the Fibres; and such Things desired

fired as will cool and allay this Heat, and mollify the over-contracted Fibres.

4. THE Tongue becomes dry, rough, &c. For when its Juices, which are separated by the salival Glands, as we have observed before, are retarded, the Fibres violently contracted, the Heat of the Body very intense, and the expired Air hot and full of acrid Particles, forced off from the Blood in the Lungs; it is impossible that the Tongue should be otherwise than hot and dry. The Skin feels dry and hard, and the whole vascular System seems to be very tense and elastic; because the Circulation, and glandular Secretions, in the Surface of the Body are greatly obstructed, and the Fibres violently contracted, by the Heat and Irritation of their contained Fluids.

5. THE

5. THE Patient becomes restless, delirious, &c. We have before observed, that Sleep is a Kind of Cessation from all voluntary Motion and Thinking: and in the Time of Sleep all the Muscles appropriated to voluntary Motions, are in a Kind of Relaxation or Looseness, and all the antagonist Muscles are in an Equilibrium and Equality of Action, not in the least overpowering one another; and likewise there is not only procured a Suspension from acting all voluntary Motions, but a Cessation from all such Thoughts as will disturb this tranquil Scene; and all the Fluids of the Body will be even and regular; and thereby all the lymphatic Secretions be greatly increased. Therefore, as long as the Fluids have this increased Velocity, and a super-abundant Quantity abounds in the Body, thereby distending, pressing,

and irritating the minute Vessels of the Brain ; as long as the Fibres are in this State of Tension and Elasticity, and the Muscles contracted ; as long as this violent Heat continues in the Fluids, which thereby irritates the Fibres of the Body, and causes such disagreeable Sensations to be conveyed to the Sensorium Commune ; as long as the Blood-globules are so much distended that they cannot enter the minute Vessels of the Body, and the Circulation be carried on even and uniform ; perpetual Watchings must constantly afflict the Patient, the Fibres of the Brain must be kept in a constant State of Tension, and a Delirium must be the Consequence. Spasms and convulsive Motions of the Fibres must arise from their being strongly distended and irritated by the Fluids ; the increased Heat of which exalts their Salts and Oils to that Degree as to render them acrid.

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The Urine's being thin and Flame-coloured without Sediment, is because the increased Velocity of the Blood prevents its more gross Parts from being separated; and by the great Heat of the Blood will the Colour of the Urine be heightened. Sweat not appearing in this Disorder, though the Heat is very violent, may be accounted for several Ways.

1. BECAUSE the Fibres of the Body are in such a State of Tension, that the cuticular Glands are greatly contracted, and the Emunctories of Sweat, as it were, effaced.

2. BECAUSE the Blood-globules, being greatly distended, cannot circulate in the capillary Vessels on the Surface of the Body, and Obstructions are formed therein.

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3. By the Blood-globules being distended, they attract and retain a greater Quantity of the serous Parts more than they used to do, and consequently this and the other glandular Secretions must be much decreased.

P R O P. III.

To describe the Termination of the Disease, and the Consequences which must necessarily follow.

THIS Disease must either terminate in Death, Health, or another Disease; therefore from the Violence of its Effects we must judge of its Termination; which will be found as follows.

1. THIS Fever terminates in Death, either from the Destruction of the Tone or Elasticity

Elasticity of the Fibres, or from the too great Force, Resistance, or Acrimony of the Fluids, or from such a Depravity of them, that they obstruct all the minute Vessels of the Body, especially those which greatly conduce to animal Life, or by which new Fluids should be prepared to replenish the Place of those which are consumed. Which may be known by the following Symptoms. When the Fever begins with a Convulsion, or when convulsive Motions or Spasms of the Tendons come on in the State of the Disease; when the Skin is parched and dry, and Sweat cannot be procured by any Medicine whatever; when the Disease is attended with a violent Vomiting, Diarrhoea, or Hiccups; when the Disease is attended with an involuntary passing of the Urine, and Stools; when a great Loss of Memory, Lethargy, or violent Delirium attends; when a cold clammy Sweat breaks

out upon the extreme Parts, and a violent Heat in the internal Parts: All these shew that the Solids are almost destroyed, and the Fluids in such a depraved State, as renders them incapable of performing the animal Functions, and except there is immediate Relief, the Disease must soon end in Death.

2. THIS Disease terminates in Health, whenever the material Cause is by the Powers of the Body, and Force of the Fever, subdued, resolved, rendered duly fluxile with the circulating Fluids, and thrown off in the Form of insensible Perspiration; which may be known by the Pulse becoming even and regular, and the Patient falling into a gentle Diaphoresis. This Disease may likewise terminate in Health, when the same Matter of the Disease is subdued, resolved, and rendered fluxile

fluxile with the circulating Fluids, by the Powers of the Body and Fever as afore-said; but still this Matter retains in itself some acrimonious Particles, which strongly stimulate the Vessels in circulating, and are, by their contractile Force, thrown off by some sensible Evacuation, which is commonly called a Crisis; as by a Diarrhoea, a violent Sweat, a Spitting, a large Flux of Urine, or a very great Sediment appearing in the same, and sometimes by a violent Vomiting.

3. THIS Disease may terminate in another Disease, when, by the violent Velocity of the Circulation, and superabundant Quantity of Blood, the Fibres of the Body are greatly stretched, *i. e.* the Particles of Matter whereof they are composed, are forced off from their Points of Contact, but not without the Sphere of Attraction, and

the Fibres of the Body are thereby greatly relaxed; and the fine lymphatic Parts of the Blood are forced off by the strong protruding Force of the Heart and Arteries, and consequently the remaining Mass of febrile Matter is too thick and viscid, and cannot be sufficiently attenuated by the relaxed Vessels, but is mixed with the circulating Fluids, 'till, in the Course of Circulation, it passes through some Vessels that cannot give it so great Resistance as the others: then it obstructs, and accumulates upon, and gives Rise to various other Complaints, as Tumours, Abscesses, Gangrenes, Shirrhi, &c.

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P R O P. IV.

To explain the Method of allaying those violent Symptoms, and to entirely eradicate the Disease, when it is in the Power of human Art to do it.

HAVING therefore considered the Nature and Cause of this Fever, it will plainly appear that its Cure consists,

1. IN lessening the Quantity of the Blood.

2. IN attenuating, dissolving, and diluting the remaining viscid and glutinous Mass.

3. IN sheathing, absorbing, and destroying all acrid, sharp, and irritating Particles, abounding therein.

4. By condensing the rarefied Air contained in the Blood-globules, and thereby lessening their Diameters and attractive Force.

5. By rendering the Fibres of the several Parts of the Body more supple and flexible, particularly those which surround and compass the secretory and excretory Ducts.

6. By decreasing the too great and disproportioned Force, with which the Blood is protruded against the Sides of its containing Vessels,

THEREFORE, in order to answer the first Intention, we must lay it down as a Fact, that not any thing in the World is so efficacious here as Bleeding, which should be repeated

repeated as often as the Symptoms require. For by Bleeding is the Quantity of the Blood immediately diminished, and consequently a less Quantity of that Fluid passes in equal Times through the Heart, as it finds a proportionably less Resistance from the precedent Blood, whereby the Contractions of that Spring of Life will be decreased, and likewise the Velocity of the Blood in the Arteries; whence a great Diminution in the Strength of the Pulse, and of Course in the Contractions of the Vessels. Immediately after Bleeding, if the Patient has any Sickness, Reachings, or Pain at the Stomach, order a gentle Emetic, to cleanse that Bowel; as, very often, the Stomach is so foul that it destroys the Effects of all our Medicines before they can reach the Blood. But if none of these Symptoms appear, omit the Emetic, and immediately throw up an emollient

emollient Clyster to empty the Bowels; and to give a Discharge to any bilious or acrid Matter which may be forced upon them, and, in the State of the Fever, brings on a violent Diarrhœa, which, without great Precaution is taken, may end in Death. We should likewise observe, that very often a Diarrhœa attends the Beginning of the Disease; then it will be necessary, after giving a gentle Emetic, to cleanse the Stomach, (which very often contains a Load of viscid and acrid Humours, which, when forced off by the violent Contraction of the Fibres, gives Rise to this Symptom) to restrain this Flux gradually by the *Decoct. Alb.* or, if very violent, with small Quantities of the *Decoct. Fracastorii Fulleri.* --To answer the second Intention; immediately after those Evacuations have been made, the Patient should drink frequently of thin diluting Liquors,

Liquors, made properly acid with the Juice of Lemons, or Oranges: Thin Broths will likewise be very useful here, which should be made of Veal, Chicken, or the like.---To answer the third Intention the Patient should be immediately put into a Course of the following Medicines.

*Rx Sperm. Ceti (in q. s. Vitel. ov. sol.) ʒss.
Sal. Nitri ʒj. Aq. Alex. Simpl. ʒij. Aq.
Alex. Spt. c. Acet. ʒij. Syr. Balf. ʒiij. M. f.
haust. omni Triborio sumend. Superbibend.
haust. Theæ Melissæ.*

By these likewise will the Rarefaction of the Blood-globules, by their contained air, be allayed, as nothing in Nature more effectually answers that Intention than *Sal. Nitri*; and consequently a great Quantity of the serous Parts of the Blood, which before were enveloped in, and strongly attracted

tracted, by the Globules, will be set at Liberty; and thereby the glandular Secretions will be increased, and the Body would be inclined to Sweat, but from the violent Contractions of the Fibres:—To relieve which, by answering the fifth Proposition or Intention, it will be necessary, besides the frequent internal Use of emollient and diluting Liquors, to throw up frequently cooling emollient Clysters; and to bathe the Legs, Feet, Arms, Hands, and Hypochondria, with emollient Fomentations, which should not be much hotter than the present Heat of the Body. These will be found of infinite Service, as we have often experienced: and they are likewise much recommended by that excellent Practitioner *Dr. Huxham*. For by these the Fibres of the Body will be relaxed, and, as being dry and parched, will absorb a great Quantity of these emollient Particles, by which
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the capillary Vessels upon the Surface of the Body will be softened, and their Obstructions thereby resolved. We shall likewise add another Article which may be of great Service in this Case, and in short in all inflammatory Fevers; that is, that the Patient should hold his Head over the Steam of an emollient Fomentation, and receive the same into his Lungs with the Air: we have used this a great Number of Times, and find it of infinite Service in inflammatory Fevers, Peripneumonies, and Pleurifies.

AFTER the Fibres are, by this Means, relaxed, and the Body brought in a Disposition for sweating, we should immediately order Medicines of the following Kind, to increase that Evacuation, force off the viscid obstructing Matter which hangs on the capillary Vessels, render these Vessels
duly

duly pervious, and promote a free Circulation therein; thereby decreasing the too great Quantity of Blood in the larger Vessels, and its Force against their Sides, which will be answering the sixth Intention.

R. Bezoar. Min. ʒss; Sal. Succin. grs. iv; Cons. fruct. Cynosb. q. s. M. f. Bol. sexta quaque hora sumend. Superbibend. haust. feri vini.

THESE should be continued 'till the Signs of a Crisis appear, or, in short, 'till a Crisis is performed, except any unforeseen Symptom does contraindicate, which may be known by the violent Symptoms, which arose with the Fever, being abated; the Urine becomes less red and ardent, and deposits a large Sediment, the Heat and Dryness of the Skin and Tongue, are considerably

siderably abated, the Patient falls into a gentle Sweat, and the Pulse becomes even and regular.

As soon as we find the Crisis is performed, we should immediately order a gentle Cathartic, to cleanse the Bowels, as the excessive Heat of the Body must, of Course, generate a great Quantity of nasty stinking Fumes from the Fæces, if they are retained longer than ordinary; which may prove very detrimental to the Body; for which we would recommend some such Medicine as the following.

*R Mannæ opt. ℥j; Juscul. Avenac. ℥ij;
M. Cui adde. Tinct. Rhab. ℥j; M. f. haust.
Cath. mane cum Regimine sumendus, & postea
elapsis quatuor vel quinque Diebus, repe-
tendus ad tres vices.*

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WHEN Bleeding has been neglected in the Beginning of the Disease, or the Patient has undergone a wrong Management, a Scene of the worst of Symptoms will follow; the Plethora will increase, the Blood and Lymph grow more acrid, viscous, and fizy, and the capillary Vessels will be kept in such a State of Tension as to bring on a Delirium, Distraction of the Nerves, Spasms, Inflammations of the Viscera, &c. Here a great many of our modern Practitioners begin to order their Nostrums, Specifics, and the whole Train of Quack Medicines, *i. e.* Blistering, and what they call Alexipharmic Medicines: we call them Quack Medicines, because they cannot give a rational Account of their Operation in these Cases. Now, what is more ridiculous, when they would allay the Heat of a Fever, soften and relax the Fibres, and

and absorb the acrimonious Particles of the Fluids, than to apply a violent Stimulus to the Fibres, that are already too tense; to order hot Bolus's, Cordials, &c. to cool a hot Fluid? But our modern Practitioners, who think these will not finish the Work soon enough, stive up the Patients in hot Air, and almost stifle them with Bed-Clothes. Certainly if any thinking Man was but duely to consider this Practice, he would utterly condemn it, because he must easily conceive that the Blood cannot be cooled, nor the Fibres relaxed, by a violent Stimulus, nor Alexipharmic Boluses, nor hot Air, nor a Quantity of Bed-Clothes, &c. but on the contrary that by these the Tension of the Fibres, and Heat of the Blood must be increased. The modern Practice is, in a great many Places, first to bleed, then blister, and that profusely, then order Alexipharmic Boluses, Cordials, &c.

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and lastly apply on Plaisters or Pigeons to the Feet; and if Nature, after a long and severe Struggle, can overcome the Violence of the Disease, and the Force of their Medicines, these Practitioners are extolled to the Skies; but if Nature sinks under her Burthen, and the Soul makes her Exit; Oh! it was done according to Art, and there was no other Remedy to be tried.

It is very certain that the Use of Blistering Plaisters, where the Lymph abounds too much, where the Fibres are too lax and feeble, and when Nature begins to flag, *i. e.* when the Fibres begin to lose their Contractions, by an oppressive Force, and the Blood to run into Grumes and Viscidity, will be found of singular Service; by discharging the super-abundant Quantity of Lymph, by increasing the Contractions

tions and Vibrations of the Fibres, and thereby increasing their Action upon their contained Fluids, which, being propelled with greater Velocity than before, rebounds upon the Solids; and by this mutual Action and Re-action, is the whole Mass again invigorated; from whence it will very plainly appear; that, in the Beginning of this Fever, where the Blood is already too hot and dense; where the Fibres of the Body are too strongly contracted, and all the Fluids tend to a State of alkaline Acrimony, this Method must be very pernicious.— Having sufficiently shewn the Errors of this Practice, we will now proceed to point out the Method of relieving these violent Symptoms, which for the most Part attend this Disease when Bleeding and a proper Course of Medicine have been omitted; which are generally either a Delirium, Distractions of the Nerves,

Spasms, or Inflammations of the Viscera ; or a violent Diarrhœa, Dosing or Lethargy, Vomiting, and a violent convulsive Motion of the *Primæ Viæ* ; to which add a great Heat and Dryness of the Surface of the Body, a Symptom common to both. And, first, when a Delirium and Spasms attend the Disease, we should immediately endeavour to allay the violent Tension of the Fibres by tepid Bathing, and drinking freely of warm thin diluting Liquors ; by which Means the Fibres will be relaxed and mollified, as we have observed before, the obstructing Matter of the capillary Vessels softened, and prepared for Expulsion, or be re-absorbed by the refluent Blood, and the Action of the Vessels upon the contained Fluids decreased : Afterwards we should immediately order some such Medicine as the following to promote a gentle Diaphoresis.

R Bezoar.

*R Bezoar. min. ʒss; Conf. Cynosb. q. s.
M. f. Bol. omni triborio sumend. superbibend.
haust, seqt.*

*R Aq. Alex. simpl. ʒij; Sal. vol. succin.
gr. xij; Tinct. Cast. Russ. gt. l; Sp. nitri.
dul. gt. xx; Syr. Bals. ʒiij; M. f. haust.*

These continued, with plentiful drinking thin diluting Liquors, seldom fail to remove those Symptoms and bring on a plentiful Diaphoresis. But if, notwithstanding the Use of these, the Patient is afflicted with a Delirium or great Wakefulness; at the Time the Body is bathed with an emollient Fomentation, let the Head be bathed with warm Vinegar, which will be found of infinite Service.

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BUT when a violent Diarrhoea, with a Dosing, Lethargy, or convulsive Motion of the Stomach and Bowels come on, the Case is very desperate, and for the most Part ends in Death; however it is sometimes curable; and certainly we should never pronounce that dismal Sentence to the Patient till the Soul makes her Exit, since we have some few Examples of Patients recovering when all our Hopes were past. In these Cases we must endeavour to check the Flux by Stool as soon as possible, and encourage a Perspiration. For which the *Decoct. Alb.* should be drank freely, and every four or five Hours, three or four Spoonfuls of the *Decoctum Fracastorii Fulleri* should be added; a Plaister of the *Emplast. Stomach.* should be immediately applied to the Stomach, and every third or fourth Hour the following Bolus should be ordered

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ed, and washed down with a Draught of the *Decoct. Alb.*

℞ *Confect. Damocrat.* ʒss; *Bezoar. min. pul. Cast. Russ. aa. gr. xij*; *Syr. Bals. q. s.*
M. f. bol.

BUT when all these have been omitted, and the Physician not called till the Disease is in its last and most dismal Stage; that is, when no critical Discharge can be obtained by the Strength of Nature, but she begins to sink under her Load, the Fibres to lose their Contractions and Vibrations, and the Fluids, for want of a proper Degree of Motion, begin to coalesce and form Grumes, the Solids relax, the Pulse grows low and flow, and often intermits, a Stupor, Subsultus Tendinum, and cold clammy Sweats appear, Nature being at her last gasp;—here the Cure is very dif-

ferent from what it was before; all relaxing and cooling Medicines will now be very detrimental, and bring Death immediately. Now the Cure must be pursued with Cordial and nervous Medicines, such as the following.

℞ Bezoar. min. Cast. Russ. aa gr. xv; Camph. gr. iij; Conf. Cardiac. ℥j; Syr. Balf. q. s. M. f. bol. sexta quaque hora sumend. superbibend. haust. seqt.

℞ Aq. Alex. simp. ℥iss; Sal. vol. Succin. gr. xij; Spt. Lavend. c. ℥j; Tinct. Croci, gt. l; Syr. Balf. ℥iij; M. f. haust.

THESE should be washed down with large Draughts of some comfortable diluting Liquid; which are the most likely to give a gentle Stimulus to the Fibres, to dissolve, and keep in a proper State of Fluidity the
Mass

Mass of Fluids, that are now running
 into Cohesions and Grumes. Here Blisters
 will be of great Service to give a Stimulus
 to the Solids, and relieve oppressed Nature.
 And if the Fibres have not entirely lost
 their Contractions and Vibrations, and the
 Fluids are not so much corrupted as to be
 utterly incapable of performing the Func-
 tions of Life; such Medicines as these
 may, by increasing the Contractions and
 Vibrations of the Fibres, and giving a pro-
 per Motion to the Fluids, bring on a Crisis.
 If such Medicines as these prove unsuccess-
 ful, we should immediately order others
 of the nervous Tribe, as they are the on-
 ly Means we have to depend upon. We
 have attended Patients in this Disease when
 all these Medicines have been used in vain,
 and the poor Patient, as we thought, just
 going to launch out into Eternity, yet Na-
 ture only, after a severe Struggle, has
 brought

brought on a critical Discharge, and the Patient been as it were snatched out of the Arms of Death.

FROM hence we may plainly see the Folly, not to say the Wickedness, of positively prognosticating the Patient's Death. And *Hippocrates*, that eminent Prognosticator, always pronounces them uncertain; likewise our great Practitioner *Boerhaave*, has asserted the same Thing: And our ingenious Countryman, Lord *Bacon*, observes, it is Quackery to pronounce Diseases incurable, and that it is the only Means of screening Ignorance from Reproach.

AFTER the Crisis is performed, and the Body purged, as we have observed before, we must endeavour gradually to restore the Contractions and Elasticity of the Fibres, and brace up the relaxed Vessels, which may be weakened, either by the Contents
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of the larger Vessels being forced into those that are smaller, by the Violence of the Disease, creating Obstructions, Inflammations, &c. or by the critical Matter being thrown on them. Here it will be very necessary for the Patient to observe a strict Regimen, which should be composed of Meats of the most easy Digestion, and greatest Nourishment, and these taken in small Quantities at a Time. Asses Milk will be found of great Service here, as will likewise Milk of any Kind. And if to these be added a gentle Exercise, and this in a clear Air, with a light stomachic Bitter, at proper Intervals, he will find his Constitution mend apace; his Fibres will be gradually brought to their Contractions and Vibrations, as before, and all the glandular Secretions will be properly performed, and Strength return much sooner than it would otherwise.

CHAP.

of the larger Vessels being forced into those
that are smaller, by the Violence of the
Disease, creating Obstructions, Inflammations,
and so on by the critical Matter being
thrown on them. Here it will be very necessary
for the Patient to observe a strict
Regimen, which should be composed of
Milk of the most easy Digestion, and
great Nourishment, and these given in
small Quantities at a Time. After which
will be found of great Service here, as will
likewise Milk of any Kind. And as to these
be added a gentle Laxative, and this in a
clear Air, with a light domestic Diet, and
proper Exercise, he will find the Continuation
of his Labour will be gradually
alleviated, and his Connections and Viscera
will be relaxed, and all the obstructions
removed, and he will be brought to his former
Strength, and his Labour will be as usual.

CHAP. II.

C H A P. VII.

Of intermitting Fevers.

P R O P. I.

To define the Nature and Cause of an intermitting Fever.

IN our preceding Chapters, we have observed, that the animal Body consists of a System of Solids and Fluids, and that when the Body is in Health, there is a perfect Equilibrium between the contractile Force of the Solids, and the Resistance of the Fluids. We have likewise observed, that

that when the animal Fibres, which compose the Vessels, are too dry, elastic, and tense, and the Fluids too much in Quantity have too great a Velocity, or, from any Cause, are rendered acrid, an acute inflammatory Fever must be the Consequence: And now we shall observe, that when the animal Fibres are too moist and flaccid, and consequently the Vessels relaxed, the Blood and Juices, especially those which circulate in the capillary Vessels of the Body, being too viscid, glutinous, and fizy; an intermitting Fever must be the Consequence: Which will be greater or less, in proportion to the Relaxation of the Vessel, and the Degree of Viscidity and Sizyness of the Fluids. For when the Fibres of the Body are strongly enveloped in too great a Quantity of humid Particles, the Particles of Matter with which they are composed will be swelled, grow soft, and spongy; consequently their attractive cohesive Force will be greatly decreased,

creased, and the humid Particles, getting in between the Particles with which the Fibre is composed, will force these Particles off from their Points of contact; whereby the Fibre grows flaccid, and the Vessels, which are composed of a Number of these Fibres, relaxed.

THE Vessels, from the Flacidity of their Fibres, being relaxed, cannot give a proper Degree of Motion to their contained Fluids, and the Motion of the Fluids being abated, their Particles will begin to cohere more strongly together, for want of a proper Degree of Motion and Attrition to expand their aerial Particles, and increase their centrifugal Force; hence the Fluids, especially those which pass through the extreme Parts of the Body, become viscid and glutinous, and rendered incapable of passing freely through these minute Vessels.

Hence all the Secretions and Excretions will be greatly retarded, and all the Fluids in the capillary Arteries and Lymphæducts are become viscid and glutinous, which increases gradually into the larger Vessels, and a Plethora will be generated in the Body, by the Blood's Circuit being shortened; and the Blood begins to recoil upon the Heart, whereby the Circulation grows languid, both from the increased Quantity and Viscidity of this Fluid; consequently the Rigour of an aguish Paroxysm will immediately begin, and continue 'till the Heart can redouble its Contractions and give the Fluids an increased Degree of Velocity, to force open the Obstructions, and attenuate the viscid Matter: Then the Fit terminates, in a great Heat of Body, which ends in a Sweat, and a turbid Urine.

WE have already observed, that in Proportion to the Relaxation of the Vessels, and Viscidity of the Fluids, will the Fever be greater or less, *i. e.* will the Intervals of Time between the Fits be longer or shorter. In some Intermittents the Fit returns every twenty-four Hours; this Species being called Quotidian; and here the Relaxation of the Vessels and Viscidity of the Fluids are very great, and consequently Matter enough generated to renew the Fit in this Time. In other Intermittents the Fit returns once every two Days; this Species is called Tertian; and the Vessels here are not so much relaxed, nor the Blood so viscid as in the last, thereby requiring a longer Time to generate a new Fit. In other Intermittents the Fit returns but once every three Days; this Species is called Quartan; and here the Vessels are

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still

still less relaxed, and the Fluids less viscid than in the Tertian.

THE procatactic Causes of intermitting Fevers are a light, moist, foggy, Atmosphere; too much Rest or Inactivity, using too great a Quantity of viscid cold Aliments; or whatever causes a Relaxation of the Fibres of the Body, and too great a Viscidity of the Fluids. Hence the Reason why intermitting Fevers or Agues, are always epidemic in low fenny Countries, or when the Air has been for sometime replete with moist Vapours. A very moist Air is always more light than a dry Air, so that the Fibres of the Body must now be relaxed for two Reasons:

1st. THE humid Particles of the Air adhering to the Fibres of the Vessels upon the Surface of the Body, disunite their constituent

stituent Particles, as we have observed before; and,

2dly. Its Pressure upon the Body in general will be much decreased, and consequently the Fibres much relaxed. From whence we may plainly see why Valetudinarians, and Persons of weak Fibres, always complain of a great Heaviness and Lassitude when the Atmosphere is light and moist, *i. e.* because their Fibres are relaxed, and the attractive cohesive Force of their constituent Particles decreased, for want of a proper Pressure, and from too great a Moisture, of the circum-ambient Atmosphere; by which the Fluids in the capillary Vessels, for want of a proper Degree of Motion from those Vessels, begin to grow viscid, and the Circulation languid, which gave Rise to this disagreeable Sensation that attends those Persons.

THE Fibres may be rendered too lax and flaccid by too much Inactivity and Rest; for by Inactivity and Rest will the Quantity of the lymphatic Secretions be greatly increased, and the Quantity of the expurgatory Secretions be greatly diminished, as we have observed before, whereby the active Particles of the Blood, will be enveloped in the superabundant Quantity of this lymphatic Juice, and thereby do not give that Stimulus to the Fibres which is necessary to increase their Contractions and Vibrations, but lie like a Load against the Sides of the Vessels; whereby they are distended, and consequently relaxed. Now the contrary, *i. e.* Exercise and Activity, decreases the Quantity of the lymphatic Secretions, and promotes the contrary; thereby discharging the superabundant Quantity of these Juices, which are replenished

nished by Rest and Sleep; whereby the active Particles of the Blood are set at Liberty, and gently stimulate the Sides of their containing Vessels, which increases their Contractions and Vibrations, and the Strength of those Vessels. Hence we may plainly see the Reason of the brawny Muscles and Strength of Body of those who use great Exercise.

THE Fibres may be too much relaxed, and the Fluids too viscid, and impoverished, by using too great a Quantity of viscid Food, *i. e.* whose Particles of Matter are very hard to be separated, by the Action of the digestive Powers. If a Course of these Aliments be persisted in for some Time, they greatly corrupt the whole Mass of Fluids, by replenishing them with such Particles as are unfit for the Services of the animal Oeconomy, or such as are,

mixed with the Mass of Fluids, not sufficiently dissolved to pass freely through the minute Vessels of the Body ; whence proceeds, first, Obstructions of those minute Vessels ; secondly, a Viscidity of the Fluids ; and thirdly, a Relaxation of the Fibres which compose those Vessels.

P R O P. II.

To explain the Effects of this Fever upon the animal Body.

IN our former Proposition, we have endeavoured to point out the Nature and Cause of these Fevers, and from the Cause therein described, we are now to explain the Effects of these Fevers upon an animal Body. A Paroxysm of an intermitting Fever generally begins with a Yawning, Stretching, Coldness, Heaviness, Trembling, Shivering, and Paleness or
Blueness

Blueness of the extreme Parts; the Respiration becomes very difficult, and the Patient is oppressed with Anxiety, Sickneſs, and ſometimes a Vomiting. The Pulse are low and ſlow; the Fleſh feels flaccid and cold; there is a general Laffitude and Uneaſineſs over the whole Body, and for the moſt Part great Pains, either in the Limbs or Back; the Urine now is crude and very thin. And in Proportion to the Number and Violence of thoſe Symptoms, will the ſubſequent Paroxyſm be greater or leſs. Theſe are the Symptoms which are for the moſt Part obſervable in the firſt Stage of the Paroxyſm, commonly called the cold Fit, and are immediately followed by another Stage, which begins with a great Heat, Redneſs, ſtrong and free Reſpiration, a ſtrong Pulse, violent Thirſt, great Pain in the Head and Limbs, and the Urine be-

comes red: At last the Patient falls into a profuse Sweat; the Urine now appears thick and muddy, depositing a large Quantity of a gritty Sediment; and Sleep comes without leaving the least Weakness or Uneasiness.

P R O P. II.

To point out a Method to entirely eradicate this Disease.

IN pointing out a Method to cure this Fever, the first Thing we have to observe is the natural Strength of the Patient's Fibres, and the Nature of his Fluids. Secondly, the Degree of Relaxation the Fibres are in, and the greater or less Viscidity of the Fluids. And thirdly, the Season of the Year and the Nature of the Atmosphere. First then, when the Patient is of strong Fibres, the Relaxation of them very great, the Fluids very viscid, and the Disease happening in the Spring Season; its

Cure

Cure requires the answering of three Intentions. First, to cleanse the first Passages, which from the Weakness of their Fibres, by the general Relaxation, must be very foul, by a Load of undigested Matter. Secondly, to dissolve the Viscidity and Cohesions of the Fluids. Thirdly to brace up the relaxed Fibres, increase their Contractions and Vibrations, and enable them to give a proper Degree of Velocity to the Fluids, to prevent their falling into Viscidity and Cohesions. First, to cleanse the first Passages there is not any thing in Nature answers better than a gentle Emetic: Such as the following.

R Pul. Ipecacoanhæ ʒss; Oxymel Scillit. ʒss; Aq. Flores Sambuc. ʒjss; Spt. Sal. vol. Aromat. gt. LX; M. f. haust. emetic.

THIS should be taken about Three Hours before the coming on of the Paroxysm;

oxysm; and about one Hour after the Operation of the Emetic, give the following Draught.

℞ Sal. Absynth. ʒss; Succ. Limon. ʒvj; cui adde Aq. Alex. simpl. ʒifs; Extract. Gentian. ʒj; Syr. Cort. Aurant. ʒiiij; M. f. baust.

THIS Draught should be repeated every three or four Hours, in the Interval between the Paroxysms, for two or three Days, to answer the second Intention; afterwards Medicines of the following kind, by bracing up the relaxed Fibres, and enabling them to give a proper Degree of Motion to the Fluids to prevent their falling into Cohesions and Viscidity, and by their Effects upon the Fluids themselves, *i. e.* Strengthening their Texture, will entirely eradicate the Disease.

℞ Cort.

*R Cort. Peruv. opt. pul. ℥j; Sol. Diu-
retic. ℥iss; Extract. Gentian ℥ij; Syr. Cort.
Aurant. q. s. M. f. elect. de quo capiat. q.
n. m. omni trihorio, absente paroxysmo;
superbibend. haust. theæ salviæ.*

SECONDLY, When the Patient is of very weak Fibres, past the Meridian of Life, or has been subject to the Jaundice, or Obstructions of the Viscera; the Emetic, to answer the first Intention, should be somewhat weaker than that before described the Draughts should be the same, to answer the second Intention; but to answer the third Intention, it will be necessary to use such as the following Draughts, with the cold Bath.

R Decoct.

R. Decoct. Cort. Peruv. ℥ij; Extract. Gentian ʒss; Sal. Succin. gr. xv; Syr. Cort. Aurant. ʒiij; M. f. haust. quarta quaque hora sumend. absente paroxysmo.

WHEN the Fibres of the Body are not so much relaxed, nor the Fluids so viscid, but their Lensor and Viscidity are confined only to the most minute Series of Vessels, which is the Case in that Species commonly called Quartan, the Disease is more difficult of Cure; especially when it attacks People, who are subject to Obstructions, of weak Fibres, or such as are past the Meridian of Life.

IN these Cases, after having cleansed the Stomach as before described, with some gentle Emetic, it will be necessary for the Patient to pursue such a Course as the following,

lowing, to dissolve the Viscidity and Cohesions of the Fluids in the capillary Vessels, before we dare give any thing to increase the Contractions and Vibrations of the Fibres.

R Sal. vol. C. C. gr. xv ; Succi Limon. ℥ss ; M. cui adde Essent. Antimonii, ℥j ; Extract. Gentian. ℥ss ; Aq. Alex. simpl. ℥iss ; Syr. Cort. Aurant. ℥iij ; M. f. haust.

THIS Medicine should be repeated once every five or six Hours, and be continued for ten Days at least ; afterward, such as the following should be exhibited, to brace the Fibres, and strengthen the Texture of the Fluids.

R Pul. Cort. Peruv. opt. ℥i ; Sal. Succin. ℥iss ; Syr. Cort. Aurant. q. s. M. f. elect. Capiat q. n. m. mag. quarta quaque hora, superbibend. haust. seq.

R Aq.

℞ *Aq. Alex. simpl.* ℥iss ; *Essent. Antimonii*
 ℥iss ; *Spt. Lavend. c.* ℥i ; *Extract. Gentian.*
 ℥iss ; *Syr. Cort. Aurant.* ℥iss ; *M. f. haust.*

WHEN these Paroxysms happen to youthful plethoric Persons, and tend to an inflammatory State, it will be absolutely necessary to add Nitre to the Bark, in the Room of the foregoing Salts; and likewise to use proper Dilution.—When these Fevers happen in the Autumn, and more especially, if the Atmosphere, during our Course of Medicines, is very light, they will be found very difficult of Cure, and the Course of Medicines should be longer continued: Sometimes it will be necessary to add cold Bathing to their Use. In the vernal Season, the Spring of the Circumambient Atmosphere is more strong, for the most Part, and by its increasing genial Warmth,

Warmth, it rarefies and attenuates the viscid Humours, which hang upon the Vessels in the Surface of the Body; opens the Pores, which have been long contracted by the cold of the Winter, and thereby assists Nature to throw off a great Quantity of that viscid Matter which relaxes the Fibres, and gives Rise to this Disease.

SCHOLIUM.

FROM what has been said with Regard to the Nature, Causes, and Method of Cure, of intermitting Fevers, we shall just observe, the Impossibility for any one Medicine in the World entirely to eradicate the various Species of these Diseases, and the Absurdity of ordering Specifics; especially the Peruvian Bark as a Specific in this Disease. We will, in the First Place,

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plainly account for the Operation of this Drug upon the animal Fibres and Humours, according to the Laws of Matter and Motion ; and, Secondly, prove that there can be no such Thing in Nature, as she now stands constituted, as a specific Medicine ; and this we must likewise prove by the aforefaid Laws.

FIRST, Then, we are to account for the Operation of the Peruvian Bark upon the Fibres and Humours of an animal Body. But, previous to this, we must examine into the Nature and Quality of this Drug, and likewise the Nature and Quality of the Fibres and Humours it is to act on. In the Composition of the Peruvian Bark we find three different Substances ;

I. A GUMMY Substance, or the Juice of that Tree, from which it is taken, condensed ;

denfed; and this condensed Juice has been found to confift of fuch Particles of Matter as are endued with a great attractive Force, *i. e.* fuch whose Points of Contact are very great in Proportion to their Solidities.

2. A RESINOUS Substance, or the oily Particles of that Tree condensed; and these oily Particles, besides having a very great attractive Force, as all oily Particles are known to have, are hot and acrid, as all vegetable Oils are known more or less to be.

3. A woody Substance, or the Fibres of the Vessels through which the Juices of the Tree are conveyed; this woody Substance is found to confift of Particles which are endued with a very great attractive Force, as having large Surfaces in Proportion to their Solidities. This is the

Medicine which acts upon the Fibres and Humours ; and now we will proceed to search into the Nature and Quality of those Substances which are acted upon by this Medicine.

FIRST, Then the Fibres of the human Body, as we have already observed, consist of Particles which are very elastic, and are consequently endued with a very great attractive Force ; and these Qualities increase or decrease in Proportion to the Warmth, Attrition, and Pressure of the Fluids, and the Pressure of the circum ambient Atmosphere.

2. THE Fluids of the human Body do consist of Particles of Matter which are very elastic, and are endued with a very great attractive Force, as the Blood-Globules ;
of

of Particles, whose attractive Force is much less than the former, as is likewise their Elasticity, as the Serum ; and of Particles which have a very great repulsive or centrifugal Force, as the Air which they contain. Now this centrifugal Force of the aerial Particles, which are contained in the Fluids, serves to keep this heterogeneous Mass in a proper Degree of Fluidity, by keeping its contained Particles from running into too close Contacts or Cohesions ; and this Force is increased or decreased in Proportion to the aerial Particles contained therein, *i. e.* in Proportion to the Nature of the Aliments, whether they contain a greater or less Quantity of Air, and in Proportion as this Air is more or less expanded, *i. e.* in Proportion to the Heat and Velocity of the Fluids. This is the Nature and Quality of the Parts of the hu-

man Body, which are to be acted upon by the Medicine we have just now pointed out: and now we will examine what Effects this Drug must have on a human Body, which is known to consist of such Materials as we have just now described.

WE have observed, in the Composition of the Peruvian Bark, a Juice, which is endued with a very great attractive Force, and an Oil, which, besides a very great attractive Force, has a pungent or stimulating Quality, and a woody Substance, which we may very properly call an absorbent. Now, from the Nature of the Fluids and Fibres of the human Body, we must easily conceive, that when a proper Quantity of this Drug is taken into the Body, there must immediately follow, first, a gentle Irritation of the Coats of the Stomach,

mach, by its oily Particles. Secondly, a Condensation of the Juices of the *Primæ Viæ*, being strongly attracted by, and united with, its gummy Substance, and absorbed by its woody Substance; which, joined to a Contraction of the Fibres, from the gentle Stimulus given them by its oily Particles, must produce a Costiveness; and an increased Vibration of the Fibres of the Coats of the Stomach must ensue.

Soon after the most fine Particles of this Drug, being mixed with the Chyle, enters the Blood, particularly the gummy and resinous Particles, as the woody Particles are not fine enough to enter the lacteal Vessels, where they immediately begin to exert their Force, *i. e.* to attract and unite with the globulous part of this fluid, thereby making its Particles to cohere more strongly, and consequently increases their

Elasticity ; by which this Part of the Blood will be greatly increased, and its attractive Force made superior to the centrifugal Force of its aerial Particles ; and besides this, the resinous Particles which get into the Blood Vessels have there their Effects, by stimulating the internal Coats of these Vessels, thereby increasing their Contractions and Vibrations, and consequently their Action upon the Fluids ; whence their Texture must be greatly strengthened, and the Contractions and Vibrations of the Fibres greatly increased ; and if the Use of this Drug be long persisted in, there must follow a Diminution of the Diameters of the containing Vessels, from a great Contraction of the Fibres with which they are composed, and a condensation of all the Fluids of the Body, by the Increase of their attractive Force ; by which great Obstructions must soon be formed in the lymphatic

phatic and capillary Vessels, which will soon be increased to the larger Vessels, and violent Diseases must soon ensue. But when the centrifugal Force of the aerial Particles, contained in the Fluids, is superior to the attractive Force of the Particles of the Fluids and they thereby tend to a State of Dissolution, or when the Texture of the Fluids is weakened by any other Means, or when the Fibres are relaxed, and have lost their Springiness and Elasticity, or when both these happen together; then will the Use of this Drug be excellent. Therefore in intermitting Fevers, after the Viscidity of the Fluids is dissolved, and the Vessels rendered duly pervious, will this Drug be of excellent Service, by bracing up the relaxed Fibres, increasing their Contractions and Elasticity, and strengthening the Texture of the Fluids, which must entirely eradicate this Disease.

But before the Viscidity and great cohesive Force of the Fluids are dissolved, and the Vessels rendered duly pervious, the giving this Drug must increase the Viscidity of the Fluids, and at the same Time brace up the Fibres; whence must soon follow, Obstructions, and a numerous Train of Ills, as we have observed before.

THEREFORE let us behold, and that with Admiration, the ridiculous Assertions of those who maintain that this Drug cures these (or in short any other Disease,) by its specific quality: a notion maintained by Men of great Eminence in the Practice of Medicine.

AND now having proved that the Cortex Peruvianus does not cure intermitting Fevers by any specific Quality, but according to the Laws of Matter and Motion, by which all Medicines operate; as even the Intentions which are answered by this Drug,

Drug, towards the Cure of this or any other Disease, may be answered by any other Drug of the same Tribe, according to the Quantity of their attractive and stimulating Particles ; we will next proceed to prove that there can be no such Thing in Nature (as she now stands constituted) as a SPECIFIC MEDICINE.

BUT, previous to the proof of this, we must observe, that there can be no material Substance in this Globe which has different Laws from those by which all the other Parts of Matter are governed ; for if there had been any such material substance it must disunite from, and be repulsed by, other Parts of Matter, and likewise repulse all the Parts, and consequently great Confusion would be observed in Nature ; but as at present the contrary is observed, we must conclude that no such Thing does exist, and that all the Particles of Matter
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are governed by the same Laws, consequently no specific Medicine can exist. But we will, to humour those Asserters of specific Medicines, admit that there are in Nature some material Substances which are not governed by the general Laws of Matter, and that these Substances are governed by Laws unknown to any human Being; yet, admitting of this, there can be no such Thing as a specific Medicine; because in most Diseases there are several Intentions to be answered, some of which are as contrary to the others, as Wisdom is to Folly; therefore any Medicine, which, by its specific Quality, would relieve some of the Symptoms of the Disease, must encrease the others, and consequently no Cure can be had thereby. Again, we will further admit that their specific Medicine relieves the Disease by answering all the Intentions required for its Cure; yet there is such a Variety

Variety in the Constitutions of those in whom the same diseases happen, that a Medicine which cures a Disease in one, will not cure that same Disease in another, and consequently that Medicine cannot be called a Specific: From whence it appears, that there can be no such Thing in Nature as a SPECIFIC MEDICINE.

CHAP.

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CHAP. VIII.

Of putrid Fevers commonly called Malignant.

PROPOSITION I.
To define the Nature and Cause of putrid Fevers.

A PUTRID Fever is a Fever which arises from a Dissolution, and Putrefaction of the animal Fluids: This Kind of Fevers is, by Physicians, sometimes called Malignant; sometimes Pestilential, Petechial, &c. and these Names are

are very often given to Fevers of a different Kind, to hide Ignorance. But that we may be as explicit as possible in treating of the Nature and Cause of these Fevers, we will endeavour to point out the Nature and Cause of each Species of these Fevers, to which they are pleased to give these dreadful Titles.

FIRST then, we will point out the Nature and Cause of that Fever which they are pleased to call Malignant. This Species of the putrid Fever arises from a Dissolution of the Crassamentum or globulous Part of the Blood, which is soon followed by a Putrefaction of the whole Mass: for when the Crassamentum or globulous Part of the Blood is dissolved, and thoroughly mixed with the serous Part, there must immediately follow, first, an Obstruction of the capillary Vessels, from the Contents of the
larger

larger Vessels being forced into those that are much smaller, as their Diameters now exceed the Diameters of the dissolved Globules. Secondly, An intestine Motion of this dissolved Mass, from its not having a proper Degree of Motion. Thirdly, a Putrefaction of the same, being the Consequence of the intestine Motion. This Dissolution of the globulous Part of the Blood, arises, either from a very great Rarefaction of its contained Air, whereby its centrifugal Force is rendered much superior to its centripetal, or attractive cohesive Force, or from the serous Part of this Fluid being replete with such Particles of Matter as have a greater attractive Force than the Particles which compose the Globules, whereby their Attraction upon the Globules will be greater than the Attraction of the Particles which compose the Globules is on each other, consequently the

the Globules must be dissolved, and united with the ferous Part.

THESE Particles of Matter must be such as are angular, and have very large Surfaces in Proportion to their Solidities, such are all Salts, particularly those which are volatile and alkaline; therefore whenever the Blood is replete with Salts of any Kind, but particularly with those which are volatile and alkaline, its globular Part must be dissolved, and a Putrefaction ensue, as it must likewise when its aerial Particles are so much expanded, that the Particles which compose the Globules, are forced out of their Spheres of Attraction. Hence therefore the Antecedents of this Species of putrid Fevers must be, whatever causes too great an Expansion of the aerial Particles contained in the Blood, as excessive heat, a very hot Atmosphere, &c.

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or this Fluid being replete with Salts, particularly those of the alkaline and volatile Kind : hence the Reason why those Persons who live constantly upon salt Provisions are so subject to this Disease.

HAVING pointed out the Nature and Cause of that Species of the putrid Fevers, which is commonly called Malignant ; we will now proceed to point out the Nature and Cause of the Species which is called Pestilential. This Species, likewise, is the Effect of a Dissolution and Putrefaction of the Blood-Globules ; but this, their Dissolution, proceeds from a different Cause ; for here the Crasis of the Blood is dissolved, and a Fever generated, by a volatile Effluvia, with which the Air is impregnated, which enters into the Blood by the Lungs with the Aliment, and through

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the capillary Vessels situated in the external Parts of the Body.

BUT, before we proceed to enquire how this volatile Effluvia produces such Effects upon the human Body, we must enquire into the Nature and Cause of this Effluvia. It is certain that Effluvia of all Kinds are nothing else than a Divisibility of the Particles of Matter, and this Divisibility of Matter must proceed from whatever forces the Particles of the dissolving Mass out of their Spheres of Attraction; and consequently they will begin to repulse each other, till they are forced into the most minute Atoms; which is what we call the Effluvia of the dissolving Mass. Now this Effluvia will be found to consist of the most active and volatile Particles of the dissolving Mass, as they are more easily

fly divided than its more gross and viscid Substances; and as all Bodies, from whence an Effluvia can arise, must have in their Composition some volatile Salts and Oils, we must from thence conclude, that the Effluvia of all Bodies must consist of their volatile Salts and Oils, minutely divided, and forming a Kind of volatile Sapo. This volatile, being repulsed by the Body of Matter from which it arises, will be strongly attracted by, and united with, the Circumambient Atmosphere, and is conveyed with the Air to Places very distant.

Now we must likewise observe, that as all Effluvia are of the same Nature and Quality of the Body from whence they arose, as being nothing else than its volatile Particles, so when these Effluvia are mixed with another Body, of the same Nature and Quality as that from whence

they arose, they must produce the same Dissolution and Divisibility of Substance; as being strongly attracted by, and united with, the most volatile Particles of the Body; whereby their Activity is very much increased, and an intestine Motion generated in the Body, by the increased Action of these Particles; and consequently a Dissolution of the Particles which compose the Body, from their being forced out of their Spheres of Attraction, by the intestine Conflict. Thus are Effluvia generated, and thus do they act upon other Bodies. Therefore in the Case before us, we may conclude, from what has been said, that a Corruption and Dissolution of the animal Fluids is no more than a Divisibility of the Particles, whereof they are composed; and by this Divisibility of their Particles, will their active Particles (which are their volatile Salts and Oils) be set at Liberty; and

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as they cannot fly off in Effluvia, because of their containing Vessels, they prey yet farther upon the remaining Mass, till its Texture is entirely destroyed, and is rendered incapable of supporting Life: then the Vessels likewise corrupt, and let those volatile Particles fly off in great Quantities, which are attracted by the Air, and conveyed to other Bodies of the same Species, where the same Effects are produced as before. And thus are contagious Diseases propagated.

HENCE, therefore, the Antecedents of pestilential or contagious Fevers must be, an Air that is replete with the Steams of rotting Animals; corrupt Food, as stale or stinking Meat, or stagnant or corrupt Water; or an Air that is replete with the Steams, or volatile Particles of the Excrements

ments of living Animals; as in Jails, Camps, close Cities, &c.

THUS having described the Nature and Cause of pestilential and contagious Fevers; it now remains for us to describe that Species of putrid Fevers, which is commonly called Petechial Fevers. And here we must say somewhat contradictory to some who have wrote on this Subject, by asserting that Petechiæ is a Symptom of putrid Fevers, and not a Fever of a different Kind, as has been asserted, and may be produced by either of the forementioned Causes, as may be plainly perceived when we point out the Cause of Petechiæ: Which may very plainly be demonstrated to be no more than the dissolved red Globules of the Blood, being forced into the minute serous or lymphatic Vessels, upon the Surface of the Body, and those Petechiæ,

chiaë, or Spots, must at first appear red, while the Blood in these minute Vessels is in Motion, but afterwards, when the Blood begins to stagnate in these Vessels, they must appear purple or livid. Thus we may plainly see, that those Spots, or Petechiæ, may not only arise in every putrid Fever, but likewise in any other Disease where the Blood-globules are dissolved, and the Diameters of their Parts are less than the Diameters of these minute Vessels.

BUT we must farther observe, that inflammatory Fevers, intermitting Fevers, &c. may likewise give Rise to a putrid Fever: As an intermitting Fever may be, by wrong Management, changed into a continual one, the viscid Fluids, in the capillary Vessels, so acted upon as to become acrid, and by an Acrimony will the Texture of the

Blood-globules be destroyed, and a putrid Fever ensue. Again, an inflammatory Fever may, at its Height, when the Heat and Acrimony of the Blood have been very intense, turn to a putrid Fever.

P R O P. II.

To point out the Effects of a putrid Fever upon an Animal Body.

THE Effects or Symptoms of putrid Fevers are so many, that it is almost impossible to define or describe them all; however we will endeavour to point out the most essential; and in order to be as accurate as possible, we shall describe the different Stages of the Disease, with the Symptoms or Effects peculiar to each. Therefore,

FIRST, The Beginning of that Species which is commonly called Malignant, is accom-

accompanied with a general Lassitude, Heaviness, and Inactivity, as if the Patient had been tired with violent Exercise; a great Dejection of Spirits, Weakness, and Faintness, although no Evacuation has been made; cold Chills and Shiverings, which are soon succeeded by Heats, but not near so great as in the inflammatory Fevers we have already described, there is often a Pain in the Loins or Back, and sometimes there is a Pain and Load at the Stomach, with Reachings, or Vomiting of black or corrupt Matter; there are Hemorrhages often, from the Nostrils, Gums, and other Parts of the Body; the Countenance of the Patient seems somewhat bloated, and more dead coloured than usual, and his Eyes, for the most Part, heavy and dull: Very often there is a Pain in some Part of the Head, sometimes over one or both Eye-brows, at other Times about the Occiput

ciput or Temples, with a *Tinnitus Aurium*. The Pulse are unequal, sometimes more hard and quick than natural, other times small, quick, and intermitting; the Urine is crude, pale, and thin; the Tongue is white, but daily grows more dark and dry. These are the general Characteristics of this Fever, during the first, second, and often to the fourth Day.

SECONDLY, In the Increase of the Disease all the fore-mentioned Effects are augmented; the Head-ach is greatly increased, with great Watchings, Coma, Delirium, and attended with great Horror and Despair; the Heat is much increased, and attended with a great Thirst; the Respiration is for the most Part laborious, and interrupted with sighing and sobbing, and the Breath very hot and foetid; the Tongue becomes black and furred, as do
likewise

likewise the Teeth and Lips ; the Pulse becomes small and intermitting, with a great Languor and Faintness ; the Urine becomes clear and of a Citron Colour, and is often tinged with Blood, but as the Disease advances towards its Height, it becomes more dark, and smells very offensive. Very often about the eighth Day, sometimes sooner, a violent Diarrhœa, or bloody Dyfentery, breaks out, and are always very dangerous ; although a gentle Diarrhœa may be of great Service, as Nature, sometimes, takes this Method to throw off the morbid Matter ; but the Stools, towards the State or Decline of the Fever, are always intolerably fœtid, livid, or black, and often attended with severe Gripings. Very often about the sixth Day, or sometimes not till the ninth Day, and at other Times about the fourth Day, Petechiæ break out, which are sometimes red and

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bright,

bright, and sometimes black, livid, or greenish ; and by the Colour of these, may the Degree of Dissolution of the Blood and Juice be known ; for the more black and numerous the Spots are, the greater is the Dissolution and Corruption of the Blood, and the more dangerous is the Disease ; and the Contrary, when the Eruptions are florid and few.

Thirdly, TOWARDS the State of the Disease, all these Symptoms are yet more augmented ; the Pulse now becomes very small and intermitting ; the Eruptions begin to turn black ; large black, or livid, Spots now appear, with Coldness of the extreme Parts ; Stupor, Syncope, Subfultus Tendinum, Hiccups, and involuntary Effusions of the Urine, and Fæces, with a Hardness and great Tension of the Belly : These are the Symptoms which, for the most

most Part, accompany the State of the Disease, and except speedy Relief can be given, Death must soon close the Scene.

Fourthly, THE Effects of a putrid Fever, which owes it Rise to Contagion, are much more quick, as this Fever seldom lasts above seven or eight Days, never above the tenth Day, and are as follows. The Patient is first attacked with a Yawning, Stretching, Lassitude, and great Sense of Weariness; and these are soon succeeded with a Coldness of the extreme Parts, and great Shuddering; great and sudden Pains in the Head, Giddiness, Loathing, Reachings, Hiccups, Vomitings, and a very great Trembling; the Pulse are very low and intermitting; there is a very great inward Heat, and that chiefly about the Præcordia, and uncertain Sweats. About the second or third Day the Patient becomes very restless,

less, and soon after, either falls into a very great Stupor, or becomes delirious, with Convulsions ; and these are soon followed with Carbuncles, Buboes, purple Spots, livid Vefications, or Hæmorrhages, and these last, without immediate Relief, with Death.

P R O P. III.

To point out the natural Termination of those Fevers.

THOSE Fevers may terminate in Health, Death, or in another Disease ; therefore from the Violence of the Effects must be judged the Violence of the Cause, and from both the Termination of the Disease.

FIRST, then, When, the Pulse are not greatly depressed and equal ; when the Respiration is pretty free ; when the Sick breaks out in gentle easy Sweats, about the
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seventh or eleventh Day; when the Urine becomes thick and deposits a large Quantity of gritty Sediment; when the Eruptions are few, and those bright and florid; when the Sick naturally inclines to Rest, and his Eyes become bright and chearful; when, about the ninth, or tenth Day, a gentle Diarrhœa breaks out, by which the Patient is very much relieved; or when the Petechiæ disappear, and soon after an itching, smarting, red Rash breaks out, or scabby Eruption likewise, about the Lips, and Nose, and the more angry these are the better: All these are Signs the Disease will terminate in Health.

Secondly, WHEN the Pulse are very small and intermitting; when the Respiration is very quick, and often interrupted; when the Skin of the Sick remains parched and dry, and the Tongue black and chapped; when

when the Eruptions turn black or livid, and large black or livid Spots, like Bruises, appear upon the Surface of the Body; when a violent Diarrhoea breaks out, or a bloody Dysentery, and the Sick has a comatose Phrenzy; when the Urine becomes black or livid, with a black Sediment, and passes off involuntary; when the Excrements pass off involuntarily, and soon after the Belly becomes hard and tense; when violent Hæmorrhages break out; when the Patient chuses to lie upon his Back with his Limbs stretched out, and catches at imaginary Flies; when there is a Subfultus Tendinum, Convulsion of the lower Jaw, and the Patient falters in his Speech; when the Eyes are more sorrowful, with involuntary Tears; when the Hypochondria are tense and inflated, with Hiccups; or when the Patient lies in a continual Stupor, or is in a continual Delirium:

lirium : All these are Signs that the Disease will terminate in Death.

Thirdly, THE Disease may terminate in another Disease, when, by the Use of Medicine, its natural Tendency to Death is stopped; but yet there is not Strength enough in Nature to throw the morbid Matter quite off the Body, by a critical Discharge, but lets it fall on the extreme Parts; whence proceed other Diseases; which will be more or less acute according to the Quantity and Quality of the morbid Matter.

Fourthly, PESTILENTIAL or contagious Fevers do, for the most Part, tend to destroy the natural Crasis of the Blood, and consequently the Life of the Patient; so that all the Patient's Hope, in these Cases, must be from Art; except in some few

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Cases,

Cases, where the contagious Matter is not very violent, where the Constitution is very good, or the Atmosphere very dry and heavy.

P R O P. VIII.

To explain the Method of removing the Causes and Effects of these Fevers.

WHEN we would remove the Cause and Effects of that Fever, which we call Putrid, and which a great many call Malignant, we must first set about destroying those Dissolvents by which the globulous Part of the Blood is dissolved. Secondly, to support the Contractions of the Solids, whereby to keep the Fluids duly fluxile. Thirdly, to discharge off the Body such Particles of the dissolved Fluids, as, by their Activity and Acrimony, will not be proper to circulate with the remaining Mass. And,

And, fourthly, to restore the whole Mass of Fluids to their natural Crasis, and strengthen the Contractions and Vibrations of the Fibres.

THEREFORE, when a Physician is called in the Beginning of this Disease, he should immediately set about preparing the Body to receive Medicines to answer the first Intention ; which Preparation should be always according to the Symptoms predominant. And, first, when the Patient is young and plethoric, or when the Attack of the Disease is violent, with great Heats, or when a Delirium is feared, it will be highly necessary to bleed; and the Quantity of the Blood to be taken away, should be in Proportion to the Strength of the Patient, and Violence of the Symptoms. Perhaps this may seem a wrong Practice to some, because of the great Sinking of the

Spirits, and sudden Weakness, which are occasioned by it, and because of the Dissolution of the Blood-globules; but we must tell those Persons, that both Theory and Experience order us to pursue this Method; as, by Bleeding, the Quantity of the dissolved Mass, or Moles Movenda, is lessened, whereby the Fibres will be enabled to make much freer Oscillations, and any inflammatory Obstruction be prevented, which otherwise, in the Course of the Disease, might be attended with dangerous Consequences.—When Bleeding is ordered in this Disease, it should be ordered as soon as possible; as, in the Beginning, the Symptoms seem to demand it, (*viz.*) the sharp Heat, tense quick Pulse, Difficulty of Respiration, and violent Pain in one or more Places of the Body. The Blood now drawn does not separate itself into Crassamentum and Serum as does Blood at other Times,

Times, but is a uniform Mass, and of a very soft Consistence, which very plainly indicates a Dissolution of its Globules. Immediately after bleeding, or as soon as the Patient can recover himself from the fainting, which generally attends it in these Cases, although the Patient is ever so strong and robust, it will be necessary to order a Dose of *Ipecacuanha*, or any other gentle Emetic, to cleanse the Stomach, which, in these Cases, is generally foul, and plainly shews itself so, by a Reaching, Vomiting, and Pain about the Præcordia. If a vomiting attends the Fever, after the Stomach has been cleansed, order immediately some such Medicine as the following Draught, and apply on an emplaister of *Emp. Stomach.* to the pit of the Stomach.

*Rx Sal. Absynth. ʒss; Succ. Limon. ʒvj.
m. cui adde Aq. Mentb. simpl. ʒiss; Extract.
Cort. Peruv. ʒss; Syr. Cort. Aurant. ʒiij;
M. f. haust. quarta quaque hora sumend.*

It will be very necessary likewise to inject a laxative Clyster of Milk, Sugar, Salt, and Lenitive Electuary, to unload the intestines, which, in the beginning of this Disease, will generally be constipated; but great Care must be taken not to bring on a Diarrhoea, which will be always attended with dangerous Consequences, except it be very mild, and accompanied with a gentle breathing Sweat.

AFTER having cleansed the Primæ viæ, and emptied the Vessels by bleeding, so much as to prevent an inflammatory Obstruction;

struction; we must proceed to order some Medicines, to endeavour to destroy those Dissolvents, by which the globulous part of the Blood is dissolved, and to support the Contractions of the Vessels, whereby to keep the Fluids duly fluxile, and from running into those Grumes and unnatural Cohesions, which, without a proper Degree of Motion, they must now run into; for which those of the following Kind will be found excellent.

R. Decoct. Cort. Peruv. ℥iss; Sal. Nitri gr. xvj; Extract. Cort. Peruv. ℥ss; Aq. Mentb. Simpl. ℥vj; Sp. Vitrioli gt. xx; Syr. Cort. Aurant. ℥iij; M. f. haust. quarta quaque hora sumend. superbibend. haust. Theæ Salviæ.

Or when the Patient is of a weak Constitution, and the Heats are not great, we

may order such as are of the following kind.

R. Sal. Absynth. ʒj; Succ. Limon. ʒss; m. Deinde adde Decoct. Cort. Peruv. ʒiss; Aq. Alex. Spt. c. acet. ʒij.; Syr. Cort. Aurant. ʒüj. M. f. haust. omni Triborio sumend.

In the Intervals of Time between the Use of these Medicines, the sick Person should drink freely of a Julep made of Port Wine and Water, of each equal Parts, and acidulated with Juice of Sev'il Oranges or Lemons; or if some Tincture of Red Roses were added, it would make it still more efficacious.

By the Use of these Medicines will the attractive cohesive force of the Blood-Globules one to another, be greatly increased,
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their Texture will be strengthened, and the Contractions of the Solids will be supported. The Use of these should be continued on till the seventh or eighth Day, notwithstanding Petechiæ appear sooner. Afterward we should proceed to order some Medicines to discharge off the Body by Perspiration, such Particles of the dissolved Fluids, as, by their Activity and Acrimony, will not be proper to circulate with the remaining Mass; for which we know of none that is better than the following.

R Bezoar. min. ʒss; Camph. gt. vj. Cons. Cynosb. q. s. M. f. bolus sexta quaque hora sumend. superbibend. haust. seq.

R Decoct. Cort. Peruv. ʒiss; Spt. Vitrioli gt. xx; Tinct. Croci ʒi; Syr. Cort. Aurant. ʒiij; M. f. haust.

Or

Or, if the Patient's Stomach will not bear the Bark ordered thus, omit the foregoing, and add the following Draught.

R. Sal. Absynth. ℥i; Succ. Limon. ℥ss; m. Deinde adde Aq. Alex. s. ℥i; Extract. Cort. Peruv. ℥j; Tinct. Cort. Peruv. ℥iss; Spt. Lavend. c. ℥i; Syr. Bals. ℥ij; M. f. haust.

Such Medicines as these may be continued on till the Crisis; with the diluting Julep as before; or, if the Patient does not like that, any other of the same nature may be ordered; but diluting will be found highly necessary at this time. If our Attempts to bring on a Perspiration are vain, and instead of a Diaphoresis a violent Diarrhœa breaks out, the Case will be dangerous; however we must endeavour to restrain the Flux gradually, with *Decoct. Alb.* in which boil some Tormen-
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til Root, and Red Roses; or the *Decoctum Fracastorii Fulleri*; which, in these Cases, will be found excellent. But here a great deal of Caution is to be used; for if the Discharge should be critical, to stop it prematurely would be attended with dangerous Consequences; therefore it will be absolutely necessary to premise a Dose of Lenitive Electuary, or some other gentle Cathartic; to carry off any putrid Matter which may be forced on the Intestines.

WHEN a Delirium comes on, at any time of the Disease, and the Belly is bound, a lenitive Clyster should be immediately injected, and the following Draught used frequently, as the Case requires.

R *Aq.*

*Rx Aq. Mentb. simpl. ℥iss; Elix. Pare-
 Soric. ʒj; Sp. Vitrioli gt. xx; Syr. Papav.
 Errat. ℥ss; M. f. haust. Anodyn.*

If this fail to procure Rest, let the Pa-
 tient's head be shaved and washed with
 warm Vinegar; which, with the Use of
 the foregoing, will be found to answer
 the End, when there is not an Inflamma-
 tion of the Brain or any of its Me-
 ninges.

HERE, give us leave to say a Word
 or two on the Use of Blisters, Hot Cor-
 dial, volatile Salts, &c. which are with
 some officinal Medicines the chief De-
 pendance in these Diseases. Hot Cor-
 dial, volatile Salts, &c. are very well
 known to dissolve the Texture of the
 Blood, and consequently, in these Cases,
 must

must be very pernicious ; as are likewise Blisters in the Beginning of the Disease, when the Fever runs high ; nay, even throughout the whole Course we cannot see any great good that can be procured by their Use, except towards the decline, when the Fibres grow torpid, the Circulation languid, and Nature wants a Spur. Here, indeed, they may be of some Service, but even now we would advise Camphire to be spread all over the blistering Plaisters before they are laid on ; as this Drug is certainly the best Corrector of Cantharides ; and nothing in Nature more effectually destroys the sharp Points of saline Bodies than this subtile Balsam.

BUT when, notwithstanding our Endeavours, no critical Discharge can be procured, to throw off such Particles of the dissolved Fluids, as, by their Activity
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and Acrimony, cannot circulate uniformly with the remaining Mass; but must dissolve the whole Mass, and bring it to Corruption, whereby the most violent Symptoms must soon succeed; as Stupor, Syncope, Tremors, Subfultus Tendinum, Coldness of the extreme Parts, Loss of Motion, Mortifications, &c. and Nature seems to be at her lowest Ebb, we must endeavour to support the miserable Patient with the most warm Cordials, Diaphoretics, &c. to the last; for we have several Instances of Persons recovering even after all those Symptoms have appeared. In these Cases, blistering, as we have observed before, will be found of great Service, especially when joined to Medicines of the following kind.

℞ Be-

*R Bezoar. Min. ℥j; Confect. Cardiac.
 ʒss; Camph. gt. viii; Conf. fruct. Cynosb.
 q. s. M. f. Bol. quarta quaque hora sumend.
 superbibend. haust. seqt.*

*R Aq. Alex. simp. ʒiss; Tinct. Cort. Pe-
 ruv. ʒij; Extract. Cort. Peruv. ʒj; Spt.
 Lavend. ʒj; Syr. Croci. ʒiij; M. f.
 haust.*

The Cure of Pestilential or contagious Fevers should be begun with vomiting, and that with a smart Vomit; and if the Intestines are loaded, they should be emptied with a gentle Clyster; afterward proceed to Diaphoretics, and the Cortex Peruvianus, as we have hinted before. Bleeding, in these Diseases, will always be pernicious, notwithstanding the Symptoms may

may run high, and in the Beginning seem to demand it. Camphire and Nitre joined to the Bark will be found of great Service here; especially when the Blood is properly diluted with such a subacid Julep as we have already recommended.

AFTER the Crisis of these Diseases is performed, we should immediately order a gentle Cathartic to cleanse the Bowels, and carry off any putrid Matter which may have been thrown thereon; which should be repeated once every four or five Days, for three or four Times; afterward the sick Person should be put on a Course of Asses Milk, to which join Medicines of the following kind, to strengthen the Texture of the Mass of Fluids, and brace up the relaxed Fibres.

R Pulv.

℞ Pulv. Cort. Peruv. opt. ℥iſs; Rad.
 Gentian. Calam. Aromatic. Cort. Flav.
 Aurant. Hiſpal. aa. ℥iij; Coccinel. ℥iſs;
 Vin. Rub. ℔ij; Infunde frigide per ſex
 Dies. Colaturæ adde Elix. Vitriol. Mynſict.
 ℥i; M. capiat coch. iv. ter in die.



Dr. Pult. Cont. Peruv. cap. 515; Rad.
~~Gentian. Colom. aromatic. Cort. Mhu.~~
Mhu. 515; Gentian. 515;
Nin. Rub. 515; Infus. 515;
Diet. Colom. 515; Rad. 515;
515; Dr. Pult. Cont. Peruv. cap. 515; com.
mainly called the Nervous Fever.



IN defining the Nature and Cause of
this Fever, it will be necessary for us
first, to observe its Antecedents, and the
Nature of the Body in which it hap-
pens; whereby we shall be the better able
CHAP. 10

C H A P. X.

Of the slow depressing Fever; commonly called the Nervous Fever.

P R O P. I.

To define the Nature and Cause of this Fever.

IN defining the Nature and Cause of this Fever, it will be necessary for us, first, to observe its Antecedents, and the Nature of the Body in which it happens; whereby we shall be the better able

to judge of its immediate Cause, and that
from undoubted Facts.

COMMON Observation teaches us, that
 this Fever, for the most Part, attacks Per-
 sons whose Fibres are very weak, and con-
 sequently their Fluids are very thin and
 vapid: for as animal heat is the immediate
 Effect of the Motion and Attrition of the
 contained Fluids, and these, their Motion
 and Attrition, will be always in Propor-
 tion to the Strength and Elasticity of the
 Fibres; therefore the Heat of the Fluids
 will be in Proportion to the Strength and
 Elasticity of the Fibres. Now when the
 Fibres are weak and lax, the Heat must
 be weaker than when they are strong and
 elastic. Again, this Fever is generally pre-
 ceded by whatever relaxes the Fibres,
 and brings on a Viscidity and Lensor in
 the Fluids which circulate in the capillary
 Vessels

Vessels of the Body; as living too much upon cold viscid Food; great Trouble and Anxiety of Mind; and immoderate Use of Venery; too copious Discharge of the most subtile Parts of the animal Fluids; or exposing the Body indiscretely to the Sun, or being too much fatigued in it. When the Relaxation of the Fibres is very great, and consequently the Heat of the Fluids much decreased, some of their Parts will be greatly dissolved, and the attractive Force of the other Parts greatly decreased. For common Observation teaches us, that by an increased Degree of Heat will the animal Fluids be inspissated; and by a Diminution of their natural Heat, will they be rendered much more thin and vapid. Therefore, from what has been said, we may reasonably conclude, that the immediate Cause of this Disease is a Relaxation of the Fibres, which compose

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the Vessels, and too great Attenuation of the Blood and Humours; especially of the Lympha; for want of a proper Degree of Heat and Motion, to preserve their natural Crasis; whereby some Parts of the Fluids run into unnatural Cohesions and Grumes, whilst others are rendered too thin and dilute, to serve for the Purposes of Life: whereby all the glandular Secretions will be greatly impaired: some letting the finest Part of the Fluids pass thro' them in too great a quantity, whilst others are obstructed, and their Action almost destroyed, by being stuffed with their grumous Parts as we before observed. Whence a slow Circulation, and a Tendency to Stagnation, of the Fluids in the Brain; as that organ is composed of the most minute Tubuli; and consequently a Diminution of all its Motions and Secretions; and of all the Senses both internal
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and

and external, which are dependent on them; and a Stupor, or very great Wakefulness must be the Consequences thereof: which are, for the most Part, the Effects of this Disease. A Delirium can never be the Effects of these Causes, except there is some Degree of Inflammation; which is very rarely the Case till the Fluids begin to fall into intestine Motions and grow acrid, and thereby irritate the minute Tubuli of the Brain; and this very seldom appears before the tenth or eleventh Day of the Disease. Therefore, we may conclude, that whatever will vitiate and impoverish the Blood, by causing too great an Attenuation of some of its Parts, and leaves the Remainder more gross and thick; whatever will diminish the Secretion of the nervous fluid, or whatever will relax the Fibres, and render them too flacid,

cid, may be the antecedent Causes of this
Fever.

PROP. II.

*To point out the Effects of this Disease upon
the human Body.*

It will always be observed, that for
some time before the Attack of this Dis-
ease, the Patient finds himself low-spirited,
inappetent, and seems loaded; he sleeps
very ill, frequently sighs, and sheds a
great deal of involuntary Tears; he finds
an inexpressible Disorder and Dejection,
which are accompanied with Fear and
Concern. But when the Fever attacks in
form, the Patient, at first, finds himself
much more heavy and dull, with a Sense
of Weariness, and soon after feels some
cold Chills and Shudderings, which are
soon succeeded by Flushes of Heat, but
not

not very violent. Soon after he finds his Spirits flag much, and has a great Load, or Pain of the Head, with a Nausea, and often an Inclination to vomit, and has a very great Dislike, or Disrelish of all Kinds of Aliments. When he vomits, nothing is thrown up but a little cold viscid Phlegm. These Symptoms, at first, will seem to intermit, but generally return with a great Aggravation towards Night; a Pain, like a Rheumatism, is felt in the Back or Loins, with an Oppression of the Breast, Anxiety, and Sinking of the Spirits; the Head grows more heavy, or giddy, and the Heats gradually Increase; the Pulse is low, quick, and unequal, sometimes intermitting; the Urine is thin and for the most Part pale, and like vapid small Beer, but without any Manner of Sediment. The Tongue, at the Beginning, is moist and white, but after-
ward

ward becomes more dry and yellow. The Heats and Chills are very uncertain and unequal, sometimes the Face glows with a sudden Colour, while the other remote Parts are cold and covered with a clammy Sweat; the Thirst is very little, the Sick scarcely ever complaining of Dryness. These are the Effects of this Fever for the first seven or eight Days; to which we may add, a pale heavy Countenance, and a great Dulness of the Eyes, with a Stupor, or very great Wakefulness; which will sometimes continue for ten or twelve Days: nay, we have often seen Persons lye for a Fortnight together in this Disease without any Sleep, and that without a Delirium or Pain of the Head. About the ninth Day, the Heaviness and Pain of the Head become much increased, with a constant Noise and ringing of the Ears, which are very disturbing to the Patient, and

and sometimes towards the State of the Disease, bring on a Delirium. The Load on the Breast, Faintness and Anxiety now grow much more urgent, and when he is moved up to sip his Liquors he often faints away. Cold clammy Sweats frequently break out suddenly on the extreme Parts; the Urine is now either more pale and lymphid, or somewhat higher coloured, and more thick; when the former is the Cause, we may soon expect a Delirium with Tremors, and Subfultus Tendinum; but the Delirium, in these Cases, is seldom very violent, and is frequently joined with Intervals of Dosing. About the tenth or eleventh Day the Tongue begins to grow dry, and profuse Sweats break forth all at once; which, on the extreme Parts, are cold and clammy. Sometimes this Matter passes off with a violent Diarrhoea. However, either is very weakening.

weakening. Frequently about the eighth or ninth Day of the Disease, Eruptions break out, which very nearly resemble Millet Seed, and have made some Persons call this the Miliary Fever. These may break out sometimes sooner, sometimes later, according to the Violence of the Disease; as they are nothing else than the attenuated Parts of the Blood forced into the capillary Vessels, and from thence upon the Surface of the Body; and according to the Violence of the Symptoms will these Eruptions sooner or later appear, or not at all.

ABOUT the fourteenth Day we may behold Nature sinking apace, the extreme Parts grow cold and pale, the Pulse trembling and fluttering, and scarcely to be felt; the Sick Person now becomes quite insensible, and a Coma appears, with vast Tremblings,

Tremblings, and convulsive Motions of the Nerves and Tendons; the Tears, Stools, and Urine run off involuntary; the Patient grows very deaf and stupid, so as not to be affected with the greatest Noise. Thus does the miserable Patient linger on till the eighteenth, twentieth, or sometimes to the thirtieth Day; and sometimes, unexpectedly, a Crisis is performed, and Nature is relieved, and very often the contrary. So that we shall, in our next Proposition, endeavour to point out the natural Termination of this Disease; as it may terminate in Health, Death, or another Disease.

P R O P.

P R O P. III.

To point out the natural Termination of this Disease.

ACCORDING to the greater or less Attenuation of the Fluids, and the Relaxation of the Fibres, the immediate Cause of the Disease, will its Effects or Symptoms be greater or less; and according as the Symptoms are more or less violent, will its Termination be either in Health, Death, or another Disease; therefore, when its Effects are not very great, its Cause cannot be very stubborn to remove, and it may end in Health. As when the Attack of the Disease is not very violent, and not attended with a violent Pain or Giddiness of the Head; when the Sinking of the Spirits and Sighing are not very great; when there is no Appearance of
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a Delirium, Convulsion or Spasm; when the Tongue continues moist, and a copious Spitting comes on; when there is a gentle warm Moisture all over the Skin, or a gentle Diarrhœa, by which all the other Symptoms are relieved; when the Noise of the Ears or Deafness end in an Imposthume of that Organ; when there is not a great Coldness, or cold clammy Sweat of the extreme Parts; when, after an Eruption comes out, the Patient is very much relieved, and falls into gentle refreshing Dozings; and when the Pulse beat even and regular, although low: when some or all of those Symptoms appear, we may conclude, that with prudent Management, the Disease will terminate in Health.

But when from the Beginning the Sick Person has a violent Pain, like a Rheumatic Pain, in some Part of his Body; when

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But when from the Beginning the Sick Person has a violent Pain, like a Rheumatic Pain, in some Part of his Body; when

when he has a violent Oppression of the Breast, with Sighings, and a laborious Breathing; when in the Increase of the Disease, the Tongue becomes dry, and trembles much when the Patient endeavours to put it out, with a Difficulty of Swallowing, continual gulping or choaking in the Throat; when a Delirium, Convulsions, or Subsultus Tendinum, come on in the Increase of the Disease, the Urine at the same Time turning from a yellowish Colour to pale, and becoming very thin; when a violent Diarrhoea breaks out of a sudden, by which the sick Person is very much weakened and enervated; when the extreme Parts become cold and pale, and are covered with a clammy Sweat; when the Pulse begins to tremble and flutter, or intermit, and the Patient becomes quite insensible and stupid, scarcely affected with the loudest

noise ;

noise; when the Tears, Urine, and Stools, run off involuntary, and the Nails begin to grow livid; when the Eruptions disappear of a sudden, and Convulsions, Delirium, or Subfultus Tendinum come on; or when the Eyes grow dim, and the Speech falters; or the Patient begins to pick the Bed Cloths: when some or all of these Symptoms appear, we may conclude the Disease will terminate in Death.

WHEN some of these dreadful Symptoms appear, tho', through the Assistance of Art, their Violence is broke, yet there is not sufficient Strength in Nature to form a Crisis, to throw off the acrid Particles of the Fluids through the common Outlets of the Body; and she lets them remain in the extreme Parts, sometimes in one Part sometimes in another; whereby various other Diseases

B b

may

may be caused, according to the Nature of the Part where this acrid Matter is thrown: When this is the Case, this Disease may be very properly said to terminate in another Disease.

P R O P. IV.

To point out a Method of curing this Disease, as far as human Art is capable of doing it.

FROM what we have said of the Nature, Cause, and Effects of this Fever, it will plainly appear, that all large Evacuations will be very detrimental herein, more especially that of Bleeding; nay, we have several Times seen a common Purge attended with bad Consequences, when exhibited in the Beginning of the Disease: However, it will always be found absolutely necessary to order a gentle Emetic,
to

to cleanse the Stomach. It should never be omitted when there is any Sickness at Stomach, Nausea, or Vomiting; which will frequently be found to attend the attack of the Disease. If the Body is bound, a gentle Clyster of Milk, Sugar, and Salt, may be safely injected; and be repeated every two or three Days, if there is Occasion. Afterward we may order some gentle Diaphoretics and cordial Medicines, which should be washed down with Sage Tea, Wine Whey, Barley Water, or some thin diluting Liquids: In these Cases the following Medicines will be found very beneficial, increasing or decreasing the Dose, according to the Strength of the Patient's Fibres, and Violence of the Disease.

℞ *Pulv. Contrayerv. Comp.* ʒj; *Bezoar.*
Min. gr. xii; *Campb. gr. iij*; *Conf. fruct.*
Cynosb. q. s. *M. f. bol. quarta quaque hora su-*
mendus, superbibend. haust. seqt.

℞ *Aq. Alex. simpl.* ʒiss; *Pæon c.* ʒij;
Tinct. Cust. Ruf. gt. xxx; *Syr. Bals.* ʒiij;
M. f. haust.

When the Patient has a very great De-
 jection of Spirits, with a Wakefulness and
 Anxiety, Blisters should be applied to the
 Arms, Legs, and Occiput, at proper In-
 tervals; but we would always advise to
 omit the Blisters in the Beginning of this
 Disease, except there is urgent Necessity
 for their Use; and to the Draughts should
 be added of *Elixir Paregoricum*, thirty,
 forty, or fifty Drops, as the Case re-
 quires.

It

It will always be observed that strong Opiates given in this Disease will be attended with bad Consequences; but when the Opiate is given in small Quantities and mixed with Camphire, it will always have very good Effects by bringing on a gentle Perspiration and a Dosing, which are very refreshing. And likewise it will always be observed, that the Patient is never so easy, as when in a gentle breathing Sweat. Therefore it will be found very necessary for him to dilute pretty freely with thin Liquids, such as we have already observed, or Chicken Broth, which will be found excellent in this Case; and his Diet should be Panada, Sago, Jellies, &c. to which we may add, occasionally, a little Sack, or any other generous wine. The sick Person, during the Increase of the Disease, should be kept as

quiet as possible, and profuse Sweats should never be encouraged; as they will always be attended with dangerous Consequences; such as a great Dejection of Spirits, trembling of the Pulse, Syncope, and either a Coma, or a Delirium. Therefore we should be very careful in the beginning of the Disease, how we attempt to force Sweats by volatile Salts, Spirits, and hot Cordials; and likewise how we apply on Blisters too early, as they will be found to be frequently attended with ill Consequences, although farther in the Increase of the Disease they may be very beneficial; but we would always advise the spreading of Camphire over all the Blisters which are laid on in these Cases; and those who will take the Hint, will find it worthy their Notice. When Eruptions appear, Blisters should always be omitted, and the Eruptions be encouraged with gentle

gentle Diaphoretics. For when these Eruptions appear, it plainly teaches us, there is Strength enough in the Fibres to force out this acrid attenuated Matter upon the Surface of the Body; and that the Intention, which should be answered by the Blisters is answered by Nature. And if we, by these Spurs, endeavour to increase the Contractions of the Fibres, we may bring on Spasms and convulsive Motions, and thereby withdraw this salutary Discharge.

BUT farther towards the State of the Disease, *i. e.* about the tenth or eleventh Day, we shall find the Symptoms increase, the Pulse will be found very small and unequal, though quick; the breathing will be thick and laborious, and attended with a kind of Sighing and Sobbing, great Load on the Breast, and Anxiety, with Spasms

of the internal and external Parts, although attended with no Inflammation; but they seem to arise from the Acrimony of the attenuated Matter, stimulating the Nerves of the Muscles. In these Cases it will be absolutely necessary to apply Blisters to the Arms, Legs, and Thighs, and immediately pursue the Use of the following Medicines.

R Bezoar. Min. ʒj; Pulv. Cast. Rus. gr. viij; Confect. Cardiac. ʒj; Syr. Bals. q.s. M. f. bol. quarta quaque hora sumendus, superbibend. haust. seqt.

R Aq. Alex. simpl. ʒiss; Sal. vol. Succin. gr. xij; Tinct. Cast. Rus. gt. LX; Sp. Lavend. c. ʒj; Syr. Bals. ʒiij; M. f. haust.

THIN diluting Liquors should be exhibited freely during the Use of these Medicines;

dicines; and if fifty or sixty Drops of Tincture of Castor were given in these Liquids, in the Intervals of Time between the Use of the Bolusses and Draughts, they would be found very beneficial. If a Delirium comes on, apply a large Epispastic to the Occiput, but be sure let it be covered with Camphire; and to the Draught add of Elixir Paregoricum one Drachm, omitting the Spirit of Lavender. When great Tremors and convulsive Motions come on, omit the *Confectio, Cardiac.* in the Bolus, and substitute in its place Musk ℥ss or gr. xij; which will be found excellent therein; but we must not expect a regular Crisis here, as some Persons have imagined, by a large Discharge from the Blood; for since the Disease did not arise from a real Plethora, there is no Occasion of any such large Discharge; all that
we

are to expect here, is a gentle Itching of the Body, and a breathing Sweat soon following it, a little Sediment in the Urine, two or three loose Stools, a little Discharge from an Impostumation in the Ear, or in some other Part of the Body, and soon after an Abatement of all those dreadful Symptoms. Sometimes this Matter will be thrown upon one of the great Organs of the Body, and other dangerous Diseases ensue. Very often, about the Stationary Period of the Disease, the sick Person falls into profuse Sweats, which, according to our Observation, are not critical, but rather symptomatical; and oftentimes two or three Crops of Eruptions will succeed each other, nay, sometimes we may observe four Crops; and all these without any great Relief to the Patient, except making him a little
more

more easy. These must certainly be very weakening, and greatly spin out the Disease. In these Cases we have pursued the following Method with success; and have likewise seen it countenanced by Dr. *Huxham*, a Gentleman to whom the World is very much indebted for Improvements in Medicine.

WHEN there is a Tension or Pain of the Bowels, we first order one or two Drachms of Lenitive Electuary, or less, according to the Strength of the Patient, to cleanse the Bowels, and carry off any putrid Humours which may have been thrown upon them; afterward we order Medicines of the following kind.

℞ *Decoēt. Cort. Peruv.* ℥vj; *Sal. Succin.* ℥j; *Extraēt. Gentian.* ℥j; *Aq. Mentb. pip.*

pip. ℥iss; Syr. Cort. Aurant. ℥j; M. f. mistura. Capiat Coch. iij quarta quaque hora.

OR, when the Stomach is very weak and cannot bear the aforesaid Medicines, such as the following may be found very successful.

Rx Sal. Absynth. ℥j; Succ. Limon. ℥ss; M. cui adde Aq. Alex. Simpl. ℥j; Extract. Cort. Peruv ℥ss; Tinct. Croci. Sp. Lavend. c. aa ℥j; Syr. Cort. Aurant. ℥ij; M. f. haust. sexta quaque hora sumend.

SUCH Medicines, used in the Decline of these Fevers, will always be found of infinite Service, by shortening their Decline, which otherwise will very often run out to the thirtieth Day or longer.

longer. But if the Patient, during their Use, becomes costive, he should take a small Quantity of Lenitive Electuary every two or three Days, (viz.) as much as will give a loose Stool, or two; but great Care should be taken not to bring on a Diarrhoea, as it will always be attended with dangerous Consequences.

WHEN the febrile Symptoms are allayed, it will be necessary for the Patient (who will then be in a very weak dispirited Condition, from the great Weakness and Relaxation of the Fibres and Attenuation of the Fluids) to be very careful in the Use of the Non-naturals, and particularly in the Use of his Aliments; as his digestive Powers are very weak, and consequently using too great a Quantity of Food at a Time, or using such a Food

Food as is very hard of Digestion (or where is Particles of Matter very strongly cohere together) will be found, not only to fill the Body with Crudities and undigested Juices, but to generate Obstructions, and relax the Fibres yet more. In these Cases we would advise him to pursue a Course of Asses Milk, with white Meats, Vegetables, and all Kinds of Aliments which are very easy of Digestion; to use gentle Exercise as his Strength will bear; and to use the following stomachic bitter Wine, with some Doses of Rhubarb occasionally, as the Case re-

℞ Cort. Peruv. opt. Pulv. ʒiſs; Rad. Gentian. Calam. Aromatic. Galang. Zedoari. Flor. Chamæm. Contuf. aa ʒij; Vin. Rub. ℥ij; Infunde frigide per ſex vel octo Dies. Colaturæ adde Eſſent. Antimonii Hux.

ʒj;

℥i; *Sal. Diuretic.* ℥iij; *M. capiat coob. iv ter*
in die.

By the Use of these will the Fibres of the Body be gently stimulated and contracted; the Texture of the Fluids strengthened; and the whole vascular Frame be rendered duly elastic and tense; and consequently all the Secretions and Excretions be performed in the usual and regular Manner.

CHAP.

THE HISTORY OF THE UNITED STATES OF AMERICA

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THE HISTORY OF THE UNITED STATES OF AMERICA

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C H A P. XI.

Of the SMALL POX.

P R O P. I.

*To define the Nature and Cause of the
Small-Pox.*

TO resolve this Proposition, according to the Laws of Nature, will be a Task which is both very difficult and intricate; a Task which has puzzled the greatest Physicians since this Disease has appeared in the World, and which is (as far

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as

as we have ever heard of) still unresolved. But by what means is it that Physicians of all Ages have been so puzzled to account for the Cause of this Disease? It is certainly because they pursue a wrong Course to discover such Phænomena; it is because they build their Structure only upon mere Conjecture: Some endeavouring to persuade Mankind that the variolous Contagion arises from some occult Qualities in Bodies, and is therefore past Man's Comprehension to discover; others accounting for its Cause from the Influence of the Planets; others from the Malignity of the variolous Matter, &c. with various other ridiculous Whims, which are not only groundless, but absurd in themselves. All these empty Notions we must lay aside, and endeavour to resolve this Proposition according to the genuine Laws of Matter and Motion, by which all the Diseases
incident

incident to human Bodies are to be accounted for : since, it is very certain, that there is not the least Particle of Matter in the Universe, but what must act by, and conformable to, these Laws.

It is a well known Axiom, that ever since this Disease first appeared in the World, it has been an epidemical, or contagious Disease. It is epidemical, because the Effluvia of the sick Persons who labour under this Disease is strongly attracted by the Air, and is conveyed with its current to distant Places, and there enters the Bodies of Animals with this Fluid in Respiration; where it produces its Effects, according to the Nature and Texture of the Fluids of the Body into which it is received. This infected Air may likewise be attracted by some of the Juices of the Mouth, and so will be swal-

lowed with them down into the Stomach; and from thence be conveyed to, and mixed with, the Blood by the Lacteals. Now common Observation teaches us, that the Air, thus impregnated with this various Effluvia, may be received into the Bodies of some Persons and produce no visible Effects; and in those Bodies where it does produce any Effects, those Effects shall be very different, although the Air is equally impregnated with this volatile Matter; and likewise that the Bodies, in whom this Matter has once produced its Effects, will never be subject to them again, although ever so subject to any other epidemic Disease. This will appear very wonderful to some, and seem to countenance the Notions we have already rejected. But when we examine the Matter with a little more Attention, we shall be able to give a rational Account for these

these Phænomena, according to the Laws by which all material Bodies are known to be governed.

It is certain that all Effluvia, as we have already proved, are nothing else but the most fine and volatile Particles of the Bodies from whence they arise; which are developed, and forced out of their Spheres of Attraction, by an intestine Conflict in the heterogeneous Mass of Particles with which the Bodies are composed. This volatile Matter, whose constituent Particles are very small, and consequently have large Surfaces in Proportion to their Solidities, is strongly attracted by the circumambient Atmosphere, and is, with the current of Air, waisted to distant Places, where it is conveyed into the Blood, by the Lungs, with the Aliments, and some think through the cuticular Glands, where

it produces different Effects, and sometimes none at all, according to the Nature of the Body into which it is received. Therefore, in this Case, we must now endeavour to point out, first, how the general Effects of this Effluvia are produced in the human Body. Secondly, why it produces different Effects in different Bodies. Thirdly, why it may sometimes be received into the Body without producing any Effects at all. And, fourthly, how Persons, whose Fluids have once been impregnated or dissolved with this Matter, will never suffer any ill Effects from it again, although it is ever so epidemical, and their Bodies ever so capable of receiving any other epidemic Disease.

FIRST, Then, we are to point out the Reasons how and why the variolous Effluvia

via produces its general Effects in the human Body : Which we shall do as follows.

THE variolous Effluvia being received into the Blood by the Lungs, by the Alimentary Tube, and by the Perspiratory Ducts, as we have observed before, is carried with that Fluid into the most remote Parts of the Body, so that all the whole Mass of Fluids is saturated with it; and, as we have elsewhere observed, it will be strongly attracted by that part of the Fluids from whence it was developed and set at liberty, *i. e.* the Blood-Globules, and immediately, as being an active volatile Matter, it brings on a Fermentation in their contained Substances; which soon destroys their Elasticity and attractive Force, and brings them to a State of Dissolution. The Blood-Globules being dissolved, and their volatile Particles developed and

strongly attracted by this variolous Matter, begin to grow acrid, and to irritate the Coats of their containing Vessels; and by this Irritation will the Contractions and Vibrations of the Fibres be increased, and the Contractions of the Heart and Arteries must of course be more frequent and strong; and in proportion to the Increase of these will the Velocity of the circulating Fluids be increased, and consequently their Heat; and in Proportion to their increased Velocity and Heat, will their aerial Particles be expanded; and in Proportion to the Expansion of their aerial Particles will the Blood be rarefied and inflamed: Which, joined to the Dissolution of its Globules, as we have before observed, must bring on a Train of violent Symptoms; such as must always be the Effects of an increased Heat and Rarefaction of the Blood, and a Dissolution of its Globules. And as this variolous Matter

ter is strongly attracted by, and united with, the most fine and volatile Particles contained in the Blood-Globules, when the Globules are dissolved and these active light Particles developed and set at liberty, they will be the most easy to be protruded to the Surface of the Body by the increased Velocity of the Circulation; where they are forced into the minute Vessels, with such Impetuosity as to greatly distend them, even to raise them above the Surface of the Body in the Form of Pustules; and immediately after, the Fever and Train of Symptoms, occasioned thereby, cease: Although it continues, in a small Degree, for some time, for the Reasons we have already observed in Chapter IV. Thus are produced the general Effects of this variolous Effluvia upon the human Body. And now we are to proceed to shew the second thing which we proposed, *i. e.* to point out the Reasons how and

and why it produces different Effects in different Bodies. But previous to these, we must observe, that the human Body is composed of Solids and Fluids, and these Solids and Fluids may have different Degrees of Elasticity and Motion, and in Proportion to their greater or less Elasticity and Motion will the Strength of their Texture be; and in Proportion to the Strength of their Texture, will they be more or less easy to be divided, when a Fermentation is raised in their contained Substances; and in Proportion as their Parts are more or less easy to be divided will the Effects produced thereby be greater or less. Hence, therefore, in Proportion to the Strength and Elasticity of the Fibres, and Texture of the Fluids, will the Effects of the variolous Effluvia be greater or less: Which is what common Observation does likewise teach us. For when this Effluvia is received into the Body

dy of a Person whose Fibres are strong and elastic, and whose Blood is of a good Texture, it cannot possibly produce such a Dissolution of the Globules, and such a Train of violent Symptoms, as when it is received into the Body of a Person whose Fibres are weak and relaxed, and whose Blood is loose and easily dissolved; for the former will give a great Resistance to the Fermentation caused by the variolous Matter, and consequently so large a Quantity of the Blood-Globules will not be dissolved; but the latter will not only give no Resistance to the Action of the variolous Matter, but does rather seem to forward its Action, and the Dissolution of the Blood. Hence a Train of more dangerous Symptoms will follow, which will terminate in that Species of this Disease, commonly called the Flux-Pox, or confluent Small-Pox: Whereas the Eruptions

of

of the former will be what is commonly called the regular Small-Pox ; and we may as soon expect to see Snow in June, in our temperate Climate, as to see the Confluent Small-Pox happen to a Person whose Fibres are strong and elastic, and whose Fluids have a good Texture. I mean when the Management is left to Nature ; for very often we may see Persons of such a Constitution fall into the Hands of an old Woman, or *un Medicin malgré lui*, who will so break his Constitution by a hot Air, hot Cordials, and Blisters, that they may, by their Art, force out such a Quantity of Eruptions, as may be like the Confluent Species, and which Nature never intended. On the other hand, we shall very rarely see a Person, whose Fibres are weak and relaxed, and whose Blood is loose, and tending to a Dissolution, have the Regular Small-Pox, notwithstanding
all

all that Art can do to his Assistance. Therefore, as we have already observed, the Effects of the variolous Matter upon the human Body will be greater or less, in Proportion to the Strength of the Fibres, and Texture of the Fluids.

To proceed to the third general Head, *i. e.* to point out the Reason why this variolous Matter may sometimes be received into the Body without producing any Effects at all. We have just now proved, that the Effects of this variolous Matter will be the greater upon the human Body, in Proportion to the Weakness and Relaxation of the Fibres and Texture of the Blood-Globules, *i. e.* in Proportion to their attractive cohesive Force; and likewise as the serous Part of that Fluid has a greater or less attractive Force, or is more or less impregnated with saline Bodies, which

are known to difunite its Particles: and, farther, as the Secretions and secreted Liquids are more or less uniform and regular: and we should likewise have added, as the Atmosphere is more or less cold or hot, heavy or light; as this is very often a material Circumstance in these Cases. For according as its Pressure is more or less, will the Fibres of the human Body be more or less contracted; and according to its Heat and Coldness, will the aerial Particles contained in the Fluids be more or less expanded, and consequently the Fluids rarefied and inclinable to favour the Action of the variolous Matter. Therefore from what has been said, we may plainly conclude, that when the Fibres of the Body are strong and elastic, the Blood-Globules of a good Texture, and consequently their most active volatile Particles, which are known to attract this variolous Matter

Matter with the greatest Force, enveloped in their oily and firmly cohering Particles; when the Serum is likewise of a good Consistence, and not too strongly impregnated with saline Bodies, which are known to dissolve its Substance, the Secretions, and the secreted Liquids, uniform and of a proper Consistence; and when the Atmosphere is tolerably cold and heavy: I say, when these happen together, this variolous Matter may be received in the Body, and produce no visible Effects. As, first, its active volatile Particles will be greatly condensed by the Atmosphere. Secondly, When they are received into the Body, their Action will be much retarded by the Resistance they will meet with from the strong attractive Force of the Particles of the Fluids to each other. Thirdly, The most active volatile Particles of the Fluids, by which these

these are known to be most attracted, are enveloped in their oily and firmly cohering Particles, and consequently will not attract this variolous Matter with a superior Force to that of the more viscid and dense Particles. And, Fourthly, as this variolous Matter being much condensed by the Air, has an equal Degree of Attraction with all the Particles of the Blood; as the whole Mass is of a good Consistence, and firmly cohering, its active Particles yet remaining will be enveloped in the oily and more dense Particles of that Fluid, and consequently be rendered inactive, and produce no Effects at all.

How Persons, whose Fluids have once been saturated or dissolved by this variolous Matter, will never suffer any ill Effects from it again, although ever so epidemical,

cal, and their Bodies ever so capable of receiving any other Disease, is what remains now to be treated of. It is certain that the Texture of our Fluids is composed of Particles of Matter which have various Degrees of Attraction and Repulsion, and consequently have different Surfaces in proportion to their Solidities; and likewise it is plain, that those Particles, which are the most fine and volatile, are endued with the greatest attractive Force, as their Surfaces are very large in Proportion to their Solidities; and those Particles of our Fluids, which have the greatest attractive Force, will always be found to attract the variolous Effluvia, or indeed any other contagious Effluvia, according to their Density, with a stronger Force than the other Parts of our Fluids; and consequently the contagious Matter exerts its greatest Force upon these Particles (as we

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have

have already observed) as it is by them most strongly attracted and retained; whereby their Texture will be destroyed before it begins to prey upon the more dense Particles; and thereby all their disunited Substance, with the variolous Matter, will be the first Particles that are protruded to the Surface of the Body, and the other Particles, which are the least dense, will be the next which will be dissolved, and so on, in Proportion to the most dense. Now when the most fine and volatile Particles of the Blood and Juices are destroyed by the variolous Effluvia, (or indeed by any other Effluvia which is very fine and volatile, as all other Effluvia which are more dense, and received into the Body, will be attracted by the more dense Particles of the Fluids) they can never be restored again to their former Elasticity and attractive Force; and consequently

quently can never attract these volatile Effluvia as before ; but when the Person receives any of this volatile Matter into his Body, for want of these active Particles to attract it, retain it, and, by its first dissolving their Substance, to forward its Operation, it will be attracted and retained by the more dense Particles of the Fluids, and very soon be enveloped in a viscid Substance, which will soon destroy its Force and render it inactive. But when the Effluvia is more dense, and consequently contains a greater Quantity of Matter in its Particles, and is received into the Body, its Particles cannot be entirely rendered inactive by the oily and viscid Particles of the Fluids, although they envelop them, but they will soon begin to exert their Force by causing an intestine Conflict in the Particles with which they are surrounded, which must soon

followed with their Dissolution; and afterward with the Dissolution of the adjacent Particles, and so on, till the whole Mass is dissolved. Of such a nature is the Effluvia which arise from putrid Bodies, Jails, &c. and the Effects of it will be putrid Fevers, and a Dissolution of the Mass of Fluids.

PROP. II.

To define the Effects, or Symptoms, of this Disease in the human Body.

WE have already observed, that the Effects of this Disease will be different in different Constitutions, *i. e.* according to the Strength of the Fibres, and the Density of the Blood: Therefore to give as clear a Definition of the Disease, and its Effects, as possible, it will be requisite for us
to

to point out the Effects of this Cause, according to the various Constitutions in which it happens.

AND, first, when the variolous Effluvia is received into the Body of a Person, whose Fibres are strong and elastic, and whose Blood is of a good Texture; he will very soon find himself oppressed with a Sense of Weariness and Indolence, without being able to discover any apparent Cause, to which he may attribute this Unneasiness: Soon after he finds himself seized with a Shivering and Coldness, which are succeeded with a violent Heat and Fever, and these attended with a Nausea and Vomiting, a violent Pain in the Back and Loins, sometimes in the Head and about the Region of the Heart, which some Authors call the Scorbiculum Cordis: His Pulse is rapid, full,

and tense; his Breathing hot, short, and laborious; his Fever increases; his Urine becomes high-coloured; his Thirst is sometimes very great; his Sleeps are short, and attended with Startings; he has a great Pain and Heaviness of the Eye-lids, and will frequently let fall involuntary Tears. Children are generally seized with convulsive Motions or epileptic Fits. Adults will sometimes be inclinable to sweat, which will retard the Eruption of the Pustules, and at other Times, without great Care, an Inflammation will be generated about the Throat, or other Parts of the Body.

ABOUT the second or third Day, oftentimes sooner, the Small-Pox will appear in the Skin, which will generally be of the regular or distinct kind, nay always, except the Patient has been improperly managed; and soon after the feverish
Symptoms

Symptoms will abate. About the sixth or seventh Day, other little red Spots will appear between the growing Pustules, and the sick Person will become more restless. About the eighth Day, or sometimes not before the ninth Day, the Pustules will be at their State, and the Matter in them will be well concocted. The Patient now begins to be restless and feverish; from some of the variolous Matter being re-absorbed by the refluent Blood, and renewing again the former Symptoms: But, by a gentle Diaphoretic and Anodyne, these Symptoms will abate, and the Small Pox gradually dry off. These are the Symptoms of this Disease, when it attacks a Person of a good Constitution, *i. e.* when the Fibres of the Body are strong and elastic, and the Blood of a proper Density; with a due Equilibrium between the Contractions of the Solids, and the Resistance

of the Fluids. But when the Quantity of the Blood is so much as to destroy this Equilibrium, and, by its Load, weaken the Contractions of the Fibres; or when the Atmosphere is very hot, and consequently the Blood tending naturally to an inflammatory State; then we are not to expect the former mild Symptoms, but others which are more strong, the Consequence of an inflammatory Blood; as a great Fever, Phrenzy, and frequently a Peripneumonic Inflammation; and in proportion to the Violence of those Symptoms will the Number of the Pustules be more or less, *i. e.* will their Tendency to the confluent kind, and the Dissolution of the Blood-Globules be more or less.

BUT, when the variolous Effluvia enter the Body of a Person whose Fibres are naturally weak, or their Elasticity has been
much

much weakened by a former Disease, or the irregular Use of the Non-Naturals; and whose Blood is loose and easily dissolved; or impregnated with a large Quantity of saline and active Particles; we must not expect the same Symptoms or Effects from the variolous Effluvia, as we have observed before, although the Heat of the Atmosphere is the same, and the Effluvia which enters both the Bodies is the same, both in Quantity and Quality; as the former Constitution greatly retarded its Operation, but this will be found to promote it.

THE Effects of this Effluvia received into a Body, whose Constitution is like that we have last described, will be found to be nearly as follows; except the Air is very hot or light; if so, they will be much increased.

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THE Patient will, in the first place, be attacked with all the Symptoms of the distinct kind, but they will be more violent, except the Fever, which will not be altogether so strong as in the other Species; the Vomiting and Nausea will be much more violent, as will likewise the Pain of the Head, and very often be attended with a Bleeding at the Nose; the Pain of the Back and Loins will be now very violent, and the Restlessness very great, with frequent Faintings and Anxiety. In Children a violent Diarrhœa attends the Disease throughout, and in Adults a Ptyalismus, and very seldom a Diarrhœa.—About the third Day, or sometimes not before the fourth or fifth Day, the Pustules at first appear like an Erysipelas, or the Eruption of the Measles, and oftentimes purple or livid Spots likewise appear, filling up the
 Space

Space between them : but notwithstanding the Fever and other Symptoms are a little abated upon the Eruption of the Pustules and Spots ; yet they continue for the most part till the secondary Fever, and are very often attended with great Restlessness and Anxiety. The Pustules in this Species do not rise and fill as in the other Sort, neither do they suppurate kindly, but are generally depressed, flat, and run one into another, and so cover almost the whole Surface of the Body, whereby they are commonly called the Confluent Kind : The Swelling of the Face, and other Parts of the Body, is now very great : on the seventh or eighth Day, the watry Matter, with which they are filled, begins to be somewhat congealed, and looks white ; and inclines to Maturation for the four or five succeeding Days, till at last it begins to grow yellow, and sometimes black:

The

The external Parts often mortify; especially when the Symptoms have been very severe and the Diffolution of the Blood and Juices has been very great.

A Ptyalismus begins about the seventh or eighth Day, frequently sooner, with a great Swelling of the Face, and other Parts of the Body.—About the eighth or ninth Day of the Disease, sometimes not before the tenth or eleventh Day, a Train of feverish Symptoms will arise, and continue till the Eruptions begin to dry away; nay, oftentimes till they are all dried off. This is caused by the putrid Matter being re-absorbed into the Blood, where it again begins to renew the former Symptoms, as we have observed before. The Pustules being dried into Scabs, about the sixteenth or seventeenth Day, begin to fall off; but when the Matter has not suppured

suppurated kindly; when the Surface of the Body turns livid: when the Eruptions do not rise very high, and the Patient is languid; we shall always find that the Disease will continue even to the twenty-fifth or thirtieth Day; and the sick Person will be afflicted either with a Coma or Delirium.

WHEN the Air is very hot and light, or hot and moist, all these Symptoms will be much increased, as we have hinted before; but when the Air is cold and dense, all these Symptoms will be much decreased, and the Patient will have a greater Chance for his Life. A hot and moist Atmosphere greatly relaxes the Fibres of the Body, congeals the Fluids in the capillary Vessels, retards the glandular Secretions, and rarefies the Blood; which makes such a Constitution of the Atmosphere

is very prejudicial to all Kinds of Fevers, but more especially to the Small-Pox.

P R O P. III.

To point out the natural Termination of this Disease.

THIS Disease, like all other Diseases, must terminate either in Life, Death, or another Disease. Therefore, according as the Blood is more or less dissolved, and according to the Strength of the Fibres, will the Disease be known to be more or less violent, and its Termination to be in Life, Death, or another Disease. Now the Blood may be known to be more or less dissolved, and the Fibres more or less elastic, by the following antecedent Causes, and their immediate Effects.

FIRST,

FIRST, then, when the Air has been, for some time before, dry and heavy; when the Patient has lived very regular, with regard to the Non-naturals, and appears to be very healthy and alert; when the Eruptions are distinct and regular; when there is no Appearance of a Delirium or Coma, and the Symptoms are mild; when, in the confluent Kind, the Pustules break out about the third Day, and soon after the Symptoms abate, and about the State they mature kindly; when the Ptyalismus is free and regular, and the Disease not accompanied with a Delirium, Coma, or any of the violent Symptoms: These Appearances denote the Disease will naturally terminate in Health.

SECONDLY, when the Atmosphere is very light and moist, and has been so for some time, or very hot; when the Patient

tient has lived very irregular, with regard
 to the Non-naturals, and leads a very de-
 bauched Course of Life; when the Fibres
 of the Body have been relaxed or weak-
 ened in their Springs by some former Dis-
 ease, or the Patient's Fluids are replete
 with saline and active Bodies; when the
 first Symptoms of the Disease are very se-
 vere, as the Vomiting, Pain of the Head,
 or Loins, and Fever, and these attended
 with a Delirium; when the Pustules ap-
 pear on the first or second Day, and ap-
 pear like an Erysipelas and cluster toge-
 ther, looking very red and angry; when
 purple or livid Petechiæ appear in the
 Skin, and the sick Person evacuates bloody
 Urine, or bleeds very much through the
 Nostrils, or any other Part of the Body,
 and a violent Diarrhœa attends; when
 about the eighth or ninth Day, being the
 suppurating State, the Symptoms of the
 first

first State do not disappear, more especially the Fever and Delirium, but, on the contrary, continue to increase; when the Head and Face swell to a greater Degree than they generally do in these Cases, are covered with a larger Quantity of Pustules than ordinary, and are accompanied with a Delirium, or violent Pulsation of the Carotids; when the Pustules fill with a clear sharp Serum, are like Water Bladders, and do not mature kindly; when at any Time of the Disease the Spitting stops, and cannot be raised again by Art; when the Spaces between the Pustules, and about their Basis, are pale or livid, and the Pustules of a dark or livid Colour, and fill with an Ichor and Matter like clotted Blood; when the sick Person purges a black foetid Ichor, or a Blood Matter, or discharges black or very foetid Urine; when in either Species he is de-

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lirious,

lirious, and a Phrenitis follows; when the Swellings of the Face, Hands, and other Parts of the Body, suddenly fall, and a Quinzy, Peripneumony, Pleurisy, or Delirium, comes on; when about the fourth or fifth Day after the Eruption, a Delirium comes on, which will generally be preceded by a violent Pain in the Head, sparkling and fixing of the Eyes, continual Watchings, and the Patient picks the Bed Clothes, or catches at imaginary Flies; and when the secondary Fever is attended with a Delirium or Coma, which cannot be removed by Art: All these Appearances denote the Disease will naturally terminate in Death.

THIRDLY, When the Symptoms of the Disease have been very violent, and Nature has not sufficient Strength to force
off

off all the morbid Matter; or when the Patient is naturally of weak Fibres, or has rendered them so by a debauched Course of Life, so that they have not a sufficient Degree of Elasticity to force off the variolous Matter quite from the Body, but let it fall on the extreme Parts: either of these may give Rise to another Disease, according to the Part of the Body this variolous Matter is forced on; and so this Disease may be said to terminate in another Disease,

E c 2

PROP.

P R O P. IV.

To find out a Method for preventing this Disease; and when it has attacked the Patient, to carry it off entirely as an inflammatory Fever, without any Eruptions at all.

THE subject of this Proposition is such, as will undoubtedly make some People think me much mistaken in my notions, or a Person who would introduce a Practice which would be for the Destruction of Mankind: But before those People begin to ridicule me for differing from their Sentiments, let me advise them to examine them carefully, and take care to prove them to be right and just; then, if they find mine differ from them, they may ridicule me as much as they please.

IN

IN endeavouring to resolve this Proposition, we shall carefully observe not to proceed farther than the Laws of Nature dictate; (for, by these Laws, this, and all other Diseases incident to the human Body, are produced, and must be cured;) and even confine our Practice to those which we have had carefully confirmed by Experience, and the Authority of some of the greatest Practitioners of the Age.

To point out a Method for preventing this Disease, is to prescribe a Method for the Patient to live regular, with regard to the Non-Naturals, and to endeavour, as much as possible, to keep his Fibres properly braced, and his Fluids of a due Consistence; to breath an Air which is free and clear, and to keep

a just Equilibrium between the Contractions of the Fibres, and the Resistance of the Fluids. These Effects attended to will certainly prevent the Small-Pox: and the Manner of attaining them, we shall advise as follows.

1. THAT the Patient chuse a Place for his Abode where the Air is fine and clear, and not too near any great populous Town.
2. That he use a Regimen of White Meats, or Meats which have not been long in Salt; and of these, with Vegetables, and Vegetable Food, he should make his Dinner, drinking with them Small Beer, Cyder, or Water; and if he has been accustomed to drink Wines, he should now drink a few Glasses of genuine Madeira, or the strong Wines of Turkey or Greece diluted. His Supper and Breakfast should be of Milk and Bread, carefully avoiding all other

other Kinds of Aliment: Likewise, at Dinner, he should carefully avoid all high seasoned Food, Meats of hard Digestion, Pickles, and tartareous Wines, and use as much Sallad Herbs, and moderately ripe Fruits, as he pleases. 3. He should go to bed before ten o'Clock, and rise early, use some Exercise, as Riding, Walking, or in short any gentle Exercise, and carefully avoid all violent Passions of the Mind. 4. If at any Time he takes cold, or has his Perspiration obstructed, he should immediately take some Method to carry it off, either by Stool, Urine, or by the cuticular Glands; lest the Equilibrium between the Solids and Fluids be broken, and a Disease ensue. 5. When ever the Air is light and full of Vapours, we would advise him to take some gentle Cathartic; as such a Constitution of the Air will always decrease Perspiration, by relaxing the

capillary Vessels, and consequently an increased Quantity of the Fluids must soon follow; which will end in a Disease. 6. If the Small-Pox become epidemical in his Neighbourhood, he should never change his Air, as is very customary in these Cases, neither should he be too free in going into Places where they are; and be very careful during that Time not to use any violent Exercise, or, in short, do any thing which may too much rarefy, or inflame his Blood, or weaken its Texture. And any Person, who observes these Rules, may be assured he will not be hurt with the Small-Pox; for if ever he should receive the Infection, its Effects will be trifling, and scarce worth minding; sometimes no visible Effects will follow, but the Disease will pass off unobserved, as we have hinted before.

As we have pointed out a Method to preserve the Body from any ill Effects of the variolous Effluvia, we must now proceed to point out the Method we have proposed for carrying off the Effects of this Effluvia, as an inflammatory Fever, and without any Eruptions at all. But we must previously observe, that this Method must be pursued before any Signs of the Eruptions appear, *i. e.* before the Texture of the Blood is dissolved, and the Matter separated from it. This Method was first practised by the great *Boerhaave*, and since by most of the Physicians of *Holland* and *Germany*, and by a great many of our own Countrymen; and may be performed as follows.

As soon as the Patient is seized with the first Symptoms of the Small-Pox, in the first Day of the contagious Inflammatory State

State, or the Beginning of the second Day, if no Eruptions appear, Bleeding should be immediately performed, to such a Quantity as his Constitution will admit of, and according to the Violence of the Symptoms and Strength of the Pulse, which should be our Guide in these Cases. Bleeding should be repeated if the Symptoms indicate it; and at the same Time the Patient should drink large Quantities of thin, diluting, subacid Drinks, in which should be given occasionally some few Grains of Salt Nitre; and at proper Intervals of Time, let him take *Antimonii Diaphoretic. Bezoar. Min.* or *Nitrum stibiatum*, in Doses proportionable to his Age, and Strength of Constitution; which must be left to the Judgment of the Physician. During the Use of these Medicines let an emollient Clyster be injected once every twelve Hours or once every Day, according

cording to the Violence of the Symptoms, and at the same Time let the external Parts of his Body be well fomented with an emollient Fomentation; and let this be repeated two or three Times every Day. The Diet during this Course of Medicine should be thin, cooling, and somewhat absorbing. The Patient should be kept in such a Degree of Heat as will encourage a free Perspiration, but not a violent Sweat, as that would be very prejudicial in these Cases, for two Reasons. First, because it will greatly weaken the Strength of the Patient, and secondly, because it robs the Blood of its most fine Particles. If the Air is very hot at this time, it will be necessary that one Part of the Window of the Patient's Room be left open, to let in the fresh Air, but not so much as to check his Perspiration.

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By the Use of this Method will the Rarefaction of the Blood be taken off, the violent Tension of the Fibres, the Consequence thereof, be removed, and the active Particles of the variolous Effluvia, which are joined to the active Particles of the Blood, be either absorbed or carried off by the increased Excretions; whereby the intestine Motion of the Blood, and the Train of Symptoms which are the Consequence thereof will be entirely removed; or at least so much abated, that the Eruptions will be scarcely perceived. For, in this Disease, it will always be observed, that in Proportion to the Rarefaction of the Blood, and the Quantity of the active Particles contained therein, will the Symptoms be more or less violent, and the Eruptions be more or less numerous, and consequently

consequently the sick Person will be in greater or less Danger. So that when the Rarefaction of the Blood is removed, and the active Particles of the variolous Matter is absorbed, the Number of Pustules must be very trifling, if there are any, and the Patient will be free from Danger.

A GREAT many Physicians of Character, and others who are their Followers, have objected to this Method of treating the Small-Pox; because, say they, the whole Mass of Fluids are impregnated with the variolous Effluvia; and consequently the Effects thereof cannot be destroyed, except we take off the whole Mass of Blood, or entirely destroy its Activity by some grand Specific: But this way of Reasoning is absurd; for it is well known, that the aforesaid Method, which we have proposed, will not only allay the
Rarefaction

Rarefaction of the Blood, soften and relax the Fibres, and absorb the active Particles of the variolous Effluvia, but, by its increasing the Quantity of the glandular Secretions, the active Particles, which are already generated in the Fluids, be forced off through the Pores of the Skin; and consequently, when the Texture of the Blood-Globules is strong, and the Fibres have a proper Degree of Elasticity, so that the former are not easily dissolved with the variolous Matter, and the latter have a sufficient Degree of Strength to throw off these active Particles, by giving the Fluids a proper Degree of Motion, the Disease may be entirely carried off without the Patient having any Eruptions. But, on the other Hand, when the Blood is naturally of a weak Texture, and the Vessels somewhat relaxed, this Method will not carry off the Disease entirely, without

without some Eruptions; and in Proportion to the Quantity of the Blood-Globules which are dissolved, will the Quantity of the Eruptions be.

WHEN the variolous Effluvia has impregnated the Blood for some Time, and the Texture of its Globules is dissolved (which may be known by the Eruptions appearing in the Skin) this Method should be forborn, as it will always be attended with dangerous Consequences, and such Methods of Cure should be pursued as we shall point out in the following Proposition. Or, if the Physician, or Patient, do not approve of this, they may pursue the following Methods of Cure from the Beginning.

PROP.

P R O P. V.

To point out the general Methods of Cure of the Small-Pox, in all its Stages ; and according to the Nature of the Constitution in which it happens, and as the Atmosphere is more or less hot or heavy.

IN the Cure of this Disease, a particular Regard must always be had to the Strength and Elasticity of the Patient's Fibres, the Density of his Fluids, and the Constitution of the Atmosphere ; upon which our Success will always depend.

FOR, in the first Place, when the Patient is of very strong Fibres, and his Blood of a good Consistence, such a Person, when attacked with the Small-Pox, will always have a smart Fever at the Attack ; more especially if the Air is very
light

light and hot. Therefore, if the Patient calls Assistance immediately after the Attack, it will be necessary to bleed, and, if there is occasion, repeat it: For Bleeding, in these Cases, will not retard the Eruption of the Pustules, as some have imagined; but, on the contrary, will greatly promote them. For when the Velocity of the Blood is very much increased, the Contractions of the Muscles will be so likewise; and both these being increased, the glandular Secretions will be greatly diminished; and consequently the variolous Matter cannot be separated from the Mass of Blood, so as to be protruded to the Surface of the Body. But, after Bleeding, the Velocity of the Blood will be greatly diminished, and the muscular Contraction decreased, by which the glandular Secretions will be greatly increased, and the variolous Matter, by the expulsive Force of

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the Circulation, be protruded to the Surface of the Body.---When the variolous Effluvia enter the Body of such a Person, and the Air at the same time is cold and heavy, it will be Needless to bleed, except the Patient has lived too free, for some Time before ; as the Fever will not be very great, and the Small-Pox will generally be of the distinct Kind. In these Cases, keeping the Sick Person in a moderate Degree of Warmth, not too hot, nor too cold, and administering Plenty of thin, diluting, subacid Liquors, with a few Grains of Nitre and the absorbent Powders, will be found to allay the Symptoms, and promote the Expulsion of the variolous Matter. In either of these Cases, when the Fibres of the Body are too much contracted, an emollient Fomentation, or, according to Dr. HUXHAM, emollient Cataplasms applied to the extreme Parts
of

of the Body, will be found to be attended with great Success; by relaxing their Fibres, and consequently making a Revolution of the variolous Matter into those Parts: nay, we have seen this Method attended with great Success, for some Days after the Eruptions have appeared, when they have not filled kindly.

BUT, when the Patient is of a very weak Constitution, *i. e.* when the Fibres of his Body are lax, and his Fluids easily separable, the foregoing Method should be omitted, and the following pursued. If the Air is hot and light when the variolous Effluvia enter the Body of such a Person, their Effects will be very violent; the Blood-Globules will be soon dissolved, by the intestine Motion raised in their contained Particles; and, the Fibres being relaxed, the broken Mass will be

F f 2 forced

forced into the lymphatic Vessels ; and this with such Violence as very often to make a rupture in those Vessels, and give Rise to an Hæmorrhage. Therefore, in these Cases, we must first endeavour to diminish the Quantity, and absorb the acrid, stimulating, and dissolving Quality of the variolous Matter. And, secondly, to strengthen the Texture of the Mass of Blood so as to enable it to protrude this variolous Matter to the Surface of the Body. These two Intentions are answered by the following Method. If the Body is very full of gross Humours, and the Dissolution of the Blood-Globules appears to be very great, immediately administer a gentle Emetic, and soon after Medicines of the following kind.

*R Bezoar. min. ʒj; Sal. Nitri gutt. xv;
Cons. Cynosb. q. s. M. f. bol. quarta quaque
hora sumend. superbibend. haust. seq.*

R

R. Aq. Alex. simpl. ℥ij; Extract. Cort. Peruv. ℥j; Sp. Vitrioli gutt. xx; Syr. Cort. Aurant. ℥iij; M. f. haust.

IN the Intervals of Time between the Use of these Medicines, the Patient should drink freely of thin, diluting, subacid Liquors, and be nourished with Panada, Chicken Broth, light Pudding, &c. and carefully avoid Heating himself too much, in Bed or up.

IT will be necessary for the Patient, in these Cases, to have the fresh Air as much as possible, as we have observed before, in the distinct Kind; and if his Body is bound, it will be right for us to inject a gentle Clyster; but great Care must be taken not to bring on a Diarrhœa, which will always be attended with Danger, except it is critical, or Nature is loaded with a superabundant Quantity of crude Humours.

If the Eruptions come out in too great a Quantity on the Breast, Neck, Head, or any of the vital Parts, it will be necessary for a Revulsion to be made, to endeavour to draw the variolous Matter more to the extreme Parts: To answer which, emollient Fomentations, or Cataplasms will be found very beneficial.

WHEN the Air is more cold and heavy, the Effects of this Effluvia will not be so great as in the Species just now described, and the preceding Medicines should not be administered too often; once every six Hours will be sufficient; and sometimes the Nitre should be omitted, *i. e.* when the Patient has not a sufficient Degree of a Fever to protrude the variolous Matter to the Surface of the Body; and in the Room thereof should be ordered the same Quantity of the Powder
of

of Contrayerva Root. In these Cases, great Care should be taken to keep the Bowels easy and free ; for when they are loaded and constipated, the Fever will be greatly increased, and, without great Care is taken, a Delirium will be brought on : and, on the other Hand, when they are too loose, a Diarrhœa will be the Consequence ; which will not only much retard the Eruption of the Pustules, but, when the Texture of the Fluids is greatly dissolved, a Diarrhœa will, for the most Part, be succeeded by a Dysentery.

WHEN the Eruptions are come out, we must endeavour to preserve the Fluids in an equal State, till the State of Maturation comes on ; for which it will be necessary, in both Species, to answer two Intentions. First, to keep the circulating Fluids in such an equal State, as is neces-

sary for the regular Expulsion of the remaining variolous Matter. And secondly, to preserve the Texture of the whole Mass, and the Vibrations of the Fibres. Therefore, to answer the first Intention, when the Constitution is good, and the Eruptions of the distinct Kind, after they are all out, the Sick will be very calm and easy, and need no other Assistance than what may be had from a good Nurse, till the State of Maturation. But when the Constitution is much broken or very weak, or the Air very hot, or the Fever has run very high, the Eruptions running one into another, and the Symptoms not abating upon their Appearance; we must be very careful in the Management of the Patient, and still continue on the former Course of Medicines. The *Cort. Peruv. cum C. Citri* will be found excellent here; but great Care must be taken to keep the
Bowels

Bowels free and easy, as we have just now observed. When the Pustules do not fill regularly, give, every six or eight Hours, half a Drachm of Bezoar Mineral. Very often about the fifth or sixth Day of the Disease, the sick Person will begin to be very restless, and have a Cough, caused by a large Discharge of acrid Humours through the Salival Glands, which, without great Care, will fall down on the Bronchia, irritate its Fibres, and give rise to these Symptoms. In these Cases, we know of no better Medicine than *Elix. Paregoric.* given in a Draught of the common Pectoral Decoction, in Doses proportionable to the Strength of the Patient, and the Violence of the Disease; and at proper Intervals. This is certainly the best opiate that can be now given, as the Opium, being guarded with Camphire, will not produce that great Relaxation, and

and universal Debility, which it is known to produce at other Times; and certainly will always be found excellent in these Cases: For there is no Medicine yet known, which will increassate thin acrid Humours, abate their Irritation, and mature the Pustules, so effectually as this Drug, properly administered; how it produces these salutary Effects we have plainly proved before. When the Salivation is very little, and that viscid, and the Breathing very difficult and laborious, we must be cautious in administering Opiates, except in small Doses, and joined with *Sal. Succin. Gum. Ammoniac. &c.* then they may be used to great Advantage; and certainly, towards the State of the Disease, there is no doing any thing without them. When the Patient is much depressed, and the Eruptions full of Lympha, or what is commonly called the crySTALLINE Pox, we may

may apply Blisters, as the Symptoms indicate, more especially if they are attended with a Coma or Delirium; but great Care must be taken not to apply any Blister, when there are any Signs of the Blood's being much dissolved, i.e. when the Eruptions are small and black, with Petechiæ, bloody Urine, and Hæmorrhages; for they will always be attended with ill Consequences, and very often with the Death of the Patient.

ABOUT the seventh or eighth Day, in the distinct Kind, and the eleventh Day, in the confluent Kind, the stationary Period of the Disease comes on, which will be very soon succeeded by a Train of violent Symptoms; in the confluent Kind the sick Person will be always in imminent Danger at this Time, and very often submits to Death: The

Swellings

Swellings of the Face, Hands, and other Parts of the Body, now sink at once, the Salivation suddenly ceases, the Pustules grow flaccid, and pit in the middle, the Interstices pale, sometimes ash-coloured or black; a Rigour comes on, which will be very soon succeeded by a high Fever, Difficulty of Breathing, Faintness, Anxiety, Tremors, and sometimes a Delirium. In these Cases Authors have advised bleeding and blistering; but certainly these will generally be attended with bad Consequences, and often with Death. As the Cause of these Symptoms is nothing more than some of the variolous Matter being re-absorbed by the reflux Blood, and mixed with the whole Mass, the former Train of Symptoms will be again excited; but will now be much stronger than in the first Stage of the Disease, because the cuticular Pores are very much obstructed;

obstructed ; consequently the volatile Particles, generated by the Dissolution, and violent Attrition of the Fluids, will not have Room to fly off through these Pores, but must be longer retained in the Blood, and pass off by Urine, or Stool ; and likewise the Body is now much weaker, and the Fibres not able to give the proper Resistance to the Fluids, to prevent their Dissolution and Putrefaction. Therefore, in these Cases, Bleeding must be very prejudicial, except the Patient was not let Blood in the Beginning, and the Fever runs very high ; but Blistering will always be attended with bad Consequences, and should never be used here. The only Method of relieving these Symptoms is by Diuretics, Diaphoretics, Anodynes, and Cathartics ; to which should be added the *Cort. Peruv.* and these should be administered occasionally, as the Symptoms indicate ;

cate; or such a Method as the following will be found generally successful.

*R. Pulv. Rhab. opt. Sal. Diuretic. aa. ℥j;
Elect. Lenitiv. ʒss; Syr. Balf. q. s. M. f.
Bol. Cathartic.*

THIS should be taken immediately after the Symptoms of the secondary Fever appear, to cleanse the *Primæ Viæ*, and carry off some of the putrid Humours, which will now be forced thereon. This will be done without exasperating any of the feverish Symptoms, but, on the contrary, soon after the Operation of the Cathartic, they will be found to be somewhat abated. Immediately, after the Use of this, order Medicines of the following Kind; and, if there is Occasion, at two or three Days End, repeat the Cathartic, and so on till the Symptoms disappear.

R. Be-

℞ Bezoar. min. ʒss; Sal. Succin. gutt.
vij; Conf. fruc. Cynosb. q. s. M. f. Bol.
quarta quaque Hora sumend. superbibend.
haust. seq.

℞ Decoēt. Cort. Peruv. ʒiss; Sal. Nitri
gutt. x; Spt. vitrioli gutt. x; Syr. Cydon.
ʒss; M. f. haust.

During the Use of these the sick Person
should drink freely of thin, diluting, sub-
acid, and antiputrescent Liquors; and
every Evening, two or three Times a Day,
or, as the Symptoms indicate, should take
the following Anodyne.

℞ Aq. Alex. Simpl. ʒiss; Tinct. Cast.
Russ. ʒj; Elix. Paregoric. ʒss; Syr. Pa-
pav. Errat. ʒiij; M. f. haust. anodyn.

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The Evening Dose should always be taken about five or six o'Clock, as the Symptoms will always be exasperated towards Night; but by the timely Use of the Anodyne, they may be very much prevented. Had the Anodyne been useless in all the other Stages, and Symptoms of this Disease; yet the Pain and Uneasiness, which arise from the Pustules, towards the stationary Period, would require its Use: For, when the Skin is inflamed and covered with Boils, the Pain and Uneasiness which arise from thence will be very great; and, without this Medicine, would bring on a Delirium. To Children we would advise small Doses of the same Elixir, and not *Diacodium*, as is frequently given; for here the Opium is guarded with Camphire, and other Ingredients, which greatly weaken its inraffating and
relaxing

relaxing Quality; and, consequently renders it less dangerous for stopping the Salivation, or any of the other Secretions. Very often, about the State of the Disease, the Salivation either stops, or abates very much, and the Matter grows very viscid; soon after, the Patient is threatened with a Suffocation, has a great Difficulty of Breathing, Hoarseness, and cannot spit off the thick viscid Matter.

In these Cases Opiates should be sparingly used, and the Patient should take freely the following Gargarysm.

R. Aq. Font. ℥ss; Mel. Ros. Acet. Commune, aa ʒj; Coq. Colaturæ ʒvj; adde Sal. Ammon. ʒj; M. f. Gargarism.

But when the Matter, which should be spit off, is swallowed with the Aliments, and it causes a Nausea or Vomiting; or, which is often the Case in Children, passes off with a Diarrhœa, and greatly weakens the Patient; we would always

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advise

advise a gentle Emetic of *Ipecacoanha*, or *Oxymel Scilliticum*; for by this will the viscid Matter be evacuated, the Stomach and Bowels relieved, and Expectoration and Respiration greatly eased.

This secondary Fever, when the Body has been much weakened by the Disease, will often return at stated Periods, and put on the Appearance of an intermitting Fever; sometimes it will fall on the Lungs, and appear like a hectic Fever. In both these Cases we would advise the Patient to be carried to a Place where the Air is clear and fine, and immediately to pursue a Course of Asses Milk, and the Use of Medicines of the following Kind.

WHEN the Disease puts on the Appearance of an Intermittent:

℞ *Tinct. Sacra*, *infus. Sennæ*, aa ʒj; *Syr. de Spina Cer.* ʒiij; *M. f. Haust. Cathartic.*
semel in septimanâ sumend. ad tres vices;
diebus intermediis capiat sequent.

℞ De-

R Decoct. Cort. Peruv. ℥iss; Extract. Gentian. ℥ss; Sal. Succin. gutt. x; Elix. Vitrioli Mynsichti gutt. xij; Syr. Cort. Aurant. ℥iij; M. f. haust. ter in die sumend. superbibend. haust. theæ salviæ.

But when the Disease puts on the Appearance of an Hæctic,

R Mannæ opt. ℥j; Fusc. Avenac. ℥ij; M. Deinde adde Pulv. Rhub. opt. Sal. Diuretic. aa. ℥j; M. f. Haust. Cathartic. Capiat ut prius.

R Bals. Tolu, (in vitel. ov. sol.) ℥ss; Aq. Menth. simpl. ℥iss; Sal. Diuretic ℥j; Syr. Bals. ℥iij; M. f. Haust. ter in die sumend.

R Decoct. Cort. Peruv. ℥vj; Extract. Gentian. ℥ij; Sal. succin. ℥j; Syr. Cort. Aurant. ℥j; M. f. Mixtura. Capiat Coch. iv. hora undecima mat. & quarta pomeridiana.

The Diet, during this Course of Medicine, should be very nutritious, and the Patient should use gentle Exercise as his Strength will bear.

C H A P. XII.

Of a PLEURISY.

P R O P. I.

*To define the Nature and Cause of this
Disease.*

A PLEURISY may be said to be present, when the Patient is afflicted with an acute Pain on either Side of the Breast, attended with a violent Fever, and a hard quick Pulse, which are much increased by the Pressure of the Air upon the Lungs, when it is drawn in hard, and decreased when the Air is forced out, or when the Patient performs Breathing without moving the Chest: He coughs most incessantly, which, because of the violent Pain it causes, he strives to suppress.

THIS

THIS Disease owns for its antecedent Causes, whatever causes too great a Rarefaction of the Blood-Globules, and too violent a Contraction of Fibres, chiefly those which compose the intercostal Muscles, the Pleura, and the Periosteum of the Ribs. And these are, first, a strong plethoric Constitution, whose Blood is naturally very dense, and whose Fibres are very elastic. 2. Drinking too great a Quantity of Spirituous or vinous Liquors, which greatly increase the Contraction of the Fibres, and the Rarefaction of the Blood-Globules. 3. Using violent Exercise in a cold dense Air; for by the great Pressure of the cold dense Air will the Fibres of the Body be greatly contracted; and, by the increased Velocity, which the Fluids receive from the violent Exercise, will their Attrition be increased, their aerial Particles be greatly expanded, and consequently their Globules greatly rarefied

fied. 4. Exposing the Body too much to the cold Air, especially when the Atmosphere is very heavy. By this the Fibres will be greatly contracted, the Perspiration be obstructed, and a violent Fever be generated; as we have pointed out in our Definition of an acute continual Fever. 5. When the Atmosphere has been very hot and light for some Time, and then suddenly changes to be very cold and heavy; or, when the Atmosphere has been very cold and heavy for some Time, and then suddenly changes to be very hot and light. When the first of these is the Case, the Fibres of the Body will be very much relaxed, and the Blood-Globules be much rarefied; but as the Pores are all open, and the Perspiration very much, no ill Consequences do attend such a State of the Constitution; till on a sudden the Air becomes cold and heavy, braces up the Fibres of the capillary Vessels, stops the Pores, obstructs
 Perspi-

Perspiration, and thereby increases the Quantity of the Blood; which, with its increased Rarefaction, and the Constriction of the capillary Vessels, will give Rise to this Fever and Inflammation. But when the second is the Case, the Fibres of the Body will be greatly contracted, the Blood-Globules be more dense and firm, the Diameters of the Pores be greatly decreased, and the Quantity of the perspirable Matter will be greatly diminished: but when on a sudden the Air changes hot, and the Atmosphere becomes very light, the Fluids will be rarefied by their being impregnated with the hot Air in the Lungs, before the Vessels are relaxed in Proportion to their Rarefaction, and those of the extreme Parts of the Body deobstructed of their viscid Contents; and consequently an inflammatory Fever must arise from the too great Resistance of the Vessels upon their rarefied Contents.

WHEN either of these give Rise to this Disease, we may call it an Idiopathic Disease, and it is for the most Part a genuine Pleurisy. There is another Species of this Disease, which is commonly called a Bastard Pleurisy, and may take its Rise from various other Causes, too tedious to mention.

THE immediate Cause of a genuine Pleurisy is an Inflammation of the Pleura. For when, by the foregoing antecedent Causes, the Fibres of the Body are greatly contracted, the Blood-Globules much rarefied, the Perspiration lessened, and consequently the Quantity of the Fluids increased; the Action of the Fibres upon the Fluids will be greatly increased, (as we have observed before) and consequently the Velocity, Attrition, and Heat of the latter, will likewise be very much increased, and their Globules more rarefied, till, at length, they are rendered incapable

pable of passing the ultimate Ramifications of the Arteries; their Diameters being now increased much above the Diameters of the minute Vessels; and besides this, the serous Part of the Fluids is now rendered much more dense and viscid: For this Part of the Fluid, when the Mass is heated much above the natural Standard, will always be found to grow more dense and viscid, and to be of the Consistence of the white of an Egg; which will not only dispose to Inflammations in general, but particularly to this Disease, or a Peripneumony; for as the Arteries expanded on Membranous Parts are extremely small, they are of course the most easily obstructed by the viscid tenacious Fluids, and consequently the most subject to Inflammations. The spurious or bastard Pleurisy is an Inflammation of the intercostal Muscles, or the Periosteum of the Ribs, but I think it should rather be called an inflammatory Rheumatism

Rheumatism. Yet, as its Effects, and Method of Cure, are somewhat like those of a genuine Pleurisy, we shall treat of it in this Chapter.

P R O P. II.

To point out the Effects of this Disease.

IMMEDIATELY after the Pleura becomes inflamed, the Patient is attacked with a shivering, which is very soon succeeded by great Heats and Thirst; a few Hours after (although sometimes much later) he is taken with a violent pricking Pain in his Side, which sometimes spreads itself towards the Shoulder Blades, towards the Spine, or towards the fore-parts of the Breast; he coughs frequently, and his Pulse is very hard and quick: In the beginning he expectorates some Matter, but it is very little in Quantity, thin, and intermixed with Particles of Blood; afterward the Quantity of
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the expectorated Matter increafes, is better digefted, but ftill mixed with fome Blood. Sometimes the Quantity of the expectorated Matter does not increafe, but that is always a bad Sign. He has a high Fever, which goes in equal Degrees with a Cough, fputting of Blood, and Pain; his Belly is for the moft part bound, and his Urine always of a high Colour; he has a great Difficulty of Breathing, and cannot lye on his Side without very great Pain and Uneafinefs.

These are the Symptoms or Effects of a genuine Pleurify; the Effects of the fpurious or baftard Pleurify, we will describe as follows.—The fick Perfon is fuddenly attacked with a pricking Pain in his Side, which fometimes moves, and is not attended with a high Fever or Cough, but is much more mild than the former; the Patient is not in fo much Pain, when he lies on the oppofite Side, as when he lies on

on the Side affected, and does not expectorate any Blood.

P R O P. III.

To point out the Termination of this Disease.

THIS Disease may terminate, as we have observed of all other Fevers, in Health, Death, or another Disease: Therefore, from the Violence of its Effects we may judge of the Violence of its immediate Cause, and from both its Termination. First, then, when the Sick Person, immediately after the Attack, expectorates bloody Matter, or pure Blood, the Disease will be very acute, and he frequently submits to Death. 2. When the Disease begins very gentle, and continues so till the sixth or seventh Day, but afterward grows worse, it is for the most part mortal. 3. A dry Pleurisy, where there is no Expectoration, and where the Pains tend

upwards, commonly ends in Death. 4. A Peripneumony following a Pleurisy is always mortal. 5. When the sick Person spits with a great Sound in his Breast, and seems to be cast down; his Eyes suffused with Redness, and clouded; the Disease will always end in Death. 6. When the Disease happens in a Person of dense strong Fibres, and whose Blood is easily rarefied, and at any time of the Disease the Expectoration stops, and he begins to catch imaginary Flies, or pick the Bed Cloaths, Death will soon close the Scene. But, on the other Hand, when the Patient expectorates freely and is eased thereby, without a Rheum at the Nose, in a great Quantity at first, and like Matter, but soon changing into white, or before the fourth Day; and continues till the Symptoms are abated, or not being long suppressed, without returning as before; when there is a Discharge of viscid grumous Blood by the hæmorrhoidal Veins; when the Patient

tient discharges a large Quantity of thick turbid Urine, with a Strangury; when ichorous or purulent Imposthumes or Tumours shew themselves behind the Ears, or on the Legs, and suppurate kindly; when a great Quantity of yellow bilious Matter is discharged by Stool before the fourth or fifth Day, and the Symptoms abate thereby; when the Pain in the Side is removed to the Shoulder, Hand, Back, or any other remote Part, with a Numbness, Pain, and Heaviness of the Part: All these Symptoms are salutary, and denote the Disease will terminate in Health.

THIS Disease may end in another Disease, as in an Empyema, or Consumption; viz. when the Force of the Inflammation is overcome by Bleeding and other Medicines, yet the Sick Person, making no Discharge upward, cannot evacuate that purulent bloody Mucus which is forced on the Vessels of the Bronchia, so that it increases
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in Quantity, and so generates an Empyema. Sometimes indeed there will be a Translocation of the viscid tenaceous Matter on some of the remote Parts, which generates a Disease there, according to the Nature of the Part on which it is forced.

P R O P. IV.

To point out the Method of Cure for each Species of this Disease, as far as Human Nature is capable of performing it.

As a Physician is Nature's Servant, he should carefully observe all her Motions, and salutary Tendencies. Therefore, when, from the foregoing salutary Symptoms, we find that Nature is about to make a critical Discharge, we should not endeavour to counter-act her in her Operations, but to assist her therein as much as possible. For instance, all violent Evacuations, Bleeding, &c. are now to be avoided,

avoided, and the Patient to be kept as calm and quiet as possible. The air, if not naturally moist, and temperately warm, must be made so by Art; the Steam of hot Water wherein were boiled emollient Herbs, Roots, &c. should be directed to his Lungs, Nostrils, Mouth, Feet, and Legs; his Diet should be very small and thin; his Medicines of the cooling kind, such as Emulsions, Ptisans, and Pectorals, with *Sal Nitri*, and sweetened with Honey: the pained Parts are to be fomented with emollient warm Decoctions, and afterward well rubbed, and stimulated with a volatile Liniment. Soft diuretic Clysters with Turpentine are to be injected, and if the hæmorrhoidal Veins do not bleed, Leeches should be immediately applied, and left to remain on till they have sucked a large Quantity of that gross viscid Blood. Rest should be procured by gentle Paregorics, if it is not natural; as by the Elixir Paregoric,

Paregoric, which, in these Cases, will be found excellent, and any Evacuation, which appears to be beneficial, should be encouraged, and assisted by Art. But when the foregoing salutary Symptoms are absent, and Nature is oppressed, we must proceed to relieve her by Art; which may be attempted as follows.

THE Patient is to be immediately bled in the Arm, out of a large Orifice to sixteen Ounces, or as his Strength, the Pulse, and the Fever shall determine, or till the Pain abates; and to be repeated as often as the Symptoms return, or till the Blood begins to grow thin and loose; then Bleeding is to be immediately avoided, although some Symptoms demand it; and the Cure is to be pursued with Medicines. After Bleeding, an emollient cooling Clyster should be immediately injected, more especially if the Body is costive; as this

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will

will be found very beneficial for two Reasons. First, it empties the Bowels of gross Excrements, Flatus, &c. Secondly, by emptying the Bowels, it takes off a great deal of their Pressure on the descending Aorta and Iliacs, and consequently a larger Quantity of Blood will descend through these Vessels, and the superior Parts be much eased thereby. Very soon after, the pained Part is to be fomented with a Fomentation made of emollient Herbs, Roots, and Seeds, boiled in Milk and Water; and immediately afterward to be anointed with the following Liniment.

R Unguent. Sambuc. ex albæa aa ℥j; Liniment. vol. ℥iij; Liniment. saponac. ℥iss; M. f. Liniment.

THIS should be done every three or four Hours; and, from the Beginning of the Disease, internal Medicines of the following Kind should be administered.

R Sperm.

R. Sperm. Ceti (in q. s. vitel. ov. sol.) ℥j;
Sal. Nitri, ℥j; Aq. Alex. simpl. ℥ij; Sp.
Sal. Ammon. gtt. xx; Oxymel scillit. ℥ij;
M. f. haust. quarta quaque hora sumend. su-
perbibend. Decoct. Pectorale ℥iv.

R. Decoct. Pectorale, ℥ij; Elix. Pare-
goric. ℥iss; Ol. Lini. s. j. (in vitel. ov. sol.)
℥ij; Sp. Nitri Dul. gtt. lx; Syr. Papav.
Errat. ℥ij; M. f. haust. omni nocte hora
somni sumend.

During the Use of these, the sick Per-
 son should drink freely of thin diluting Li-
 quors, such as thin Whey, Water Gruel,
 a Decoction of Barley and red Poppies,
 thin Chicken Broths, Emulsions, or the
 like. When the Pain is violent, the fore-
 going Anodyne Draught, after repeated
 Bleedings, should be repeated two or
 three Times a Day, or as the Case re-
 quires; and it will be found excellent in
 these Cases, as Pain is a Stimulus, which
 greatly increases the Velocity of the Cir-
 culation, and the Heat of the Fluids, and

the Lungs oppressed, we may reasonably conclude there is an Impoſthume, or a Will likewise increase their Quantity on the pained Part, which increaſes the Inflammation; ſo that from hence we may conclude that Opiates, prudently interpoſed with Bleedings, are of very great Service in all Pleuritic and Peripneumonic Diſeaſes.

BUT when a Courſe of the foregoing Kinds of Medicines hath been tried in vain, and the Diſeaſe, notwithstanding all our Endeavours, ends in an Impoſthumation of the Lungs or Pleura; which may be known by the Obſtinacy of the Pain, an imperfect Expectoration, Cough, and the Fever laſting beyond the ſixth Day, with a Shivering often returning without any manifeſt Cauſe. And by conſidering the Time the Diſeaſe has laſted, we may know when it is perfected. The Matter is ſometimes evacuated by Expectoration. When an imperfect Expectoration has preceded, and, by the Symptoms, we find the

the Lungs oppressed, we may reasonably conclude there is an Imposthume, or a Collection of Matter, in the Substance of that Organ; and in these Cases internal Medicines of the following Kind will be found very beneficial.

R Gum. Ammon. Oliban. aa ʒiij; Aq. Pullegii simpl. ʒvj; M. f. Solutio. Deinde adde Sal. Diuretic. ʒj; Oxymel Scillit. ʒj. M. capiat Cochl. iij quarta quaque hora, superbibend. Decoct. Pectorale ʒiv.

WE have several Times experienced the good Effects of these Medicines, in an Imposthumation of the Lungs, which has succeeded this Disease; particularly in one Gentleman, who, after this Disease, attended with an imperfect Expectoration, had an Imposthume of the Lungs; and with the Use of these, and a Course of Asses Milk, he discharged near a Quart of well digested Matter from that Organ; and was afterwards perfectly cured. Very

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often

often it will be observed, that the Pleura will be impostsuinated, which may be known by the following Symptoms, *viz.* a dry Cough, a Pain, and a Fever; a Weight or Heaviness oppressing the Side where the Pain first attacked, and a sharp or shooting Pain always residing in the same Place: The Patient has intense Thirst, and eructates, or rejects warm Drinks, and cannot bear to lie upon the Side affected, but must lye only upon the opposite or sound Side. When he lies down, the purulent Tumour gives him a heavy Sensation, as if it was a suspended Weight; his Body also becomes much bloated, his Countenance flushed, and his Legs swell. The Part, which is afflicted with the acute Pain, and Heaviness, being noted, must be pierced with Caustics; or an Incision must be made about as deep as the Pleura, and kept open with suppurating Medicines, that the Matter being thrown towards the

Outside

Outside by the Power of the Lungs, may leave the Pleura whole, and so an Empyema may be prevented.

BUT when we find by the Symptoms that the Disease is what is commonly called a spurious or bastard Pleurisy, we must treat it very different from the former; for more than once bleeding, in these Cases, would be very detrimental; but in its place should be substituted the following Course of Medicines.

R Manna ℥j; Jusscul. Avenae. ℥ij; M. deinde adde pul. Rhab. opt. Sal. Diuretic. aa ℥j; M. f. haust. Cathart. mane cum regimine sumendus.

R Sperm. Ceti (in vitel. ov. sol.) ℥ss; Aq. Alex. simpl. ℥ij; Spt. Nitri Dul. gut. lx; Elix. Paregoric. ℥jss; Syr. Papav. errat. ℥ss. M. f. haust. Anodyn. hora somni post cathart. sumendus.

R Bezoar Min. ℥ss; Sal. vol. succin. gutt. vi; Conf. Fruct. Cynosb. q. s. M. f.

bol. sextâ quâque horâ sumend. superbibena.

Cochl. vi. Mistura seq.

Rz *Sperm. Ceti* (in vitel. ov. sol.) *ʒiij*;
Decoct. Peſtorale *℥j*; *Sal. Nitri*, *ʒij*; *Oxy-*
mel Scillit. *ʒiſs*; *M.*

THE pained Part should be well fomented with an emollient Fomentation, and afterwards anointed with the volatile Liniment. But if, after three or four Days, these Medicines do not succeed, a large epispastic Plaister should be laid on the Part affected; and if the Pain returns at Night (which is very often the Case) with a Restlessness, the foregoing Anodyne should be repeated every Evening. The Regimen should be very light, of easy Digestion, and not flatulent; and if, at any Time of the Disease, the sick Person should be costive, a purging Clyster, or the foregoing Cathartic should be administered, to carry off the gross Humours and Flatulencies, which are often very great in this Species of Pleurifies. CHAP.

C H A P. XIII.

Of the Peripneumony.

P R O P. I.

To define the Nature and Cause of a Peripneumony.

WHEN there happens a real Inflammation in those Vessels of the Lungs which are capable of being affected therewith, as the Bronchial Arteries, those of the softer Substance of that Organ, and the Lymphatics, which attend the same throughout; that Illness is called a genuine Peripneumony. If, from an acrid De-fluxion falling on the Lungs, some of its minute Vessels should be inflamed; or if, from a heavy, viscid, pituitous Matter, the capillary

bol. sextâ quâque horâ sumend. superbibend.
Cochl. vi. Mistura seq.

R. Sperm. Ceti (in vitel. ov. sol.) ʒiij;
Decoct. Peſtorale lbj; Sal. Nitri, ʒij; Oxy-
mel Scillit. ʒiſs; M.

THE pained Part should be well fomented with an emollient Fomentation, and afterwards anointed with the volatile Liniment. But if, after three or four Days, these Medicines do not succeed, a large epispastic Plaister should be laid on the Part affected; and if the Pain returns at Night (which is very often the Case) with a Restlessness, the foregoing Anodyne should be repeated every Evening. The Regimen should be very light, of easy Digestion, and not flatulent; and if, at any Time of the Disease, the sick Person should be costive, a purging Clyster, or the foregoing Cathartic should be administered, to carry off the gross Humours and Flatulencies, which are often very great in this Species of Pleurifies. CHAP.

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capillary Vessels of this Organ should be obstructed, and an Inflammation generated thereby; either of these may be called a spurious Peripneumony, or Peripneumonia Notha.

THE antecedent Causes of this Disease are various, *i. e.* any thing which increases the Quantity, Viscidity, or Density of the Blood and Humours, or constricts the Vessels of the Lungs; as a cold heavy Atmosphere, astringent, or coagulating, Exhalations of Minerals, Salts, &c. The Chyle being too dry or viscid, or having too great a Proportion of Acrimony. Violent Exercises of the Lungs, as in running, wrestling, striving, singing, or hallooing; hard riding against cold dry Winds. Poisons or Medicines, which are coagulating or corroding, received into the Body; violent Passions of the Mind; a violent Pleurisy, or an Inflammation of the Diaphragm. The immediate Cause of this

this Disease is an Inflammation of the Vessels of the Lungs; which in the genuine Peripneumony is very great, and very often of the whole Lungs; but in the Peripneumonia Notha is only of the capillary Vessels of this Organ.

P R O P. II.
To point out the Effects of the different Species of this Disease upon the Human Body.

IMMEDIATELY after the Lungs are inflamed with a dense fizy Blood, as in the genuine Peripneumony, the Patient is attacked with a great Shivering, and a violent Rigour, which are soon succeeded by a burning Heat, with an acute Fever; a quick hot Respiration, Anxiety, Loss of Strength, tossing of the Body, and Pains about the Shoulder Blades, Clavicles, and Breast; a Difficulty of Breathing, with very great Oppression and Load at the

the Breast; he lies on his Back a little more erect than ordinary, lying on his Side being uneasy; and has a florid Redness of the Countenance; a shining of the Eyes; a small Cough, with Blood, or frothy Spittle; a great Desire of cold Air, and Drinks; a dry Mouth; a rough Tongue, at first whitish, afterwards red or black; a hard quick Pulse, with continual Watchings; and a Groaning and disturbed Sleep.

THE Disease increasing, a Sighing, with involuntary Tears, and a Bloatedness of the Neck and Face succeeds; as likewise a fixing of the Eyes; a cloudy Sight; a depraved Mind; a cold Numbness of the Joints, with Lividness: The Tongue becomes thicker, with a Sweating of the upper Parts; the Pulse becomes weak and intermitting; and lastly, there is a resounding Noise of the Breast.

THE spurious Peripneumony, or *Peripneumonia notka*, generally attacks old People,

People, and those who have got Colds or Catarrhs; and it seizes, at first, unawares, with a flattering Lenity; for beginning with a small Weariness, Lowness of Spirits, Difficulty of Breathing, and Oppression of the Breast, it excites such small Motions, that the Signs of Heat or of a Fever scarce give any Uneasiness; presently the Fever increases, with a Cough and Weakness; the Pulse various, sometimes quick and weak, sometimes sluggish and oppressed, never hard and tense, as in a genuine Peripneumony; when a Defluxion on the Lungs gives rise to this Species, it is attended with more Cough, and the Humours are more thin and acrid.

P R O P. III.

To point out the natural Termination of this Disease.

WE may likewise observe of this as of all other Fevers, that it may terminate in Health,

Health, Death, or another Disease; therefore we will, from the Violence of its Effects, endeavour to point out its natural termination. First, then, this Disease terminates in Health by a benign Resolution, or by dissipating. If the Patient is not a Person of very rigid Fibres, which have been hardened by violent Exercise, but rather of those which are soft and lax: If the Part affected be only bronchial, or but Part of the Substance of the Lungs: If after the first, second, or third bleeding, the Patient begins to spit off freely a yellowish concocted Matter, lightly tinged with Blood, and of a reasonable Thickness, by which he perceives his Pain to diminish, and his Breathing to come easier; and if it be not long before the expectorated Matter begins to be more concocted, and he spits smooth and white: If the Patient voids a great Quantity of turbid thick Urine, before the seventh Day,

and

and is greatly eased thereby, the Sediment at first red, but whitening by Degrees; the Fever coming gentle, with a Breathing Sweat equally diffused all over his Body, or a few loose Stools, with much Choler, or Matter resembling the well concocted expectorated Matter just now described: All these denote the Disease will terminate in Health. But, if the Inflammation of the Lungs is very great, and the Patient is a Person of very strong Fibres, which have been hardened by violent Exercise; if after the first, or second bleeding, the Pulse sink very much, and he falls into great Tremours, Subsultus Tendinum, profuse Sweats, or an atra-bilious Diarrhoea, with a Coma, or Delirium; if the Urine is well digested in the beginning of the Illness, but grows thin after the fourth Day; if, in the Height of the Illness, the Patient is obliged to be set upright; if a Looseness with purulent

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Matter

Matter comes on, which doth not give Ease; if the Peripneumony is of the dry Species, with a hot Ratling in the Throat, as if the Lungs were parched, with dropping of Blood from the Nose, and red Spots over the Breast; which give us to know that the Inflammation has spread itself throughout; if a strong Defluxion of sharp Matter from the Head hath preceded, or doth follow; if, after the fifth Day, the expectorated Matter is bilious with Pus; if, from the beginning of the Disease, the expectorated Matter has been very bloody, of an entire yellow Colour, or very frothy, not allaying Pain; if this Matter is of a dark brown Colour, and filthy like the Lees of Oil, and the Fever is neither abated, nor the Breathing relieved: All these Symptoms declare the Termination of the Disease in Death.

THE violent Symptoms being allayed by the Force of Nature, or the Assistance
of

of Art, so as to put the Patient out of immediate Danger, but cannot be entirely eradicated, leaving some small Part of the Lungs, or bronchial Vessels, inflamed or suppurated, declare the Termination of this Disease in another Disease, *i. e.* in a Consumption of the Lungs, or an Empyema, in which this doth very often terminate.

P R O P. IV.

To point out the Method of relieving the various Species of this Disease, as far as Art is capable of relieving them.

THIS Disease, is so common, either as an original Malady, or consequent to some other, that its Nature, Causes, and Method, should be carefully studied by every Practitioner; it being, for the most part, attended with great Danger, and requires a different Treatment in each of its different Species and Stages. For Instance, a Peripneumony arising from

an Inflammation of the Lungs by a dense fizy Blood, is very different, and requires a different Method of Cure, from one depending on a thin acrid Defluxion on the Lungs; and likewise this Species should be treated very different from that which owes its Rise to an Obstruction of the Lungs, from a heavy pituitous Matter. Therefore, as the Method of Cure in this Disease is very various, according to its different Species and Stages, we shall point out a Method of Cure for each of the Species we have taken notice of, and likewise for each of their different Stages.

IN a genuine Peripneumony, speedy, large, and repeated Bleeding is always absolutely necessary to lessen the Quantity and too rapid Motion of the Blood; yet great Regard must be had to the different Symptoms which attend it. For instance, if, in the beginning of the Disease, the Symptoms pronounce a great Inflammation
of

of the Lungs, Bleeding is the only thing in Nature which can bring immediate Relief; and oftentimes we shall observe, after the first, second, or third Bleeding, that the Patient will expectorate freely, a well concocted Matter tinged with Blood, and is eased thereby; then bleeding must be immediately avoided, otherwise this laudable Expectoration will be suppressed to the Patient's utter Ruin. But when the expectorated Matter is thin and crude, mixed with a considerable Quantity of thin, florid, frothy Blood, Bleeding is to be repeated, but with Caution, till the Matter spit off is more concocted. If, after the first Bleeding, which should be large, the Symptoms are not relieved, but are rather aggravated, for Reasons which shall be hereafter shewn, Bleeding must be repeated, at the Interval of eight or twelve Hours; more especially if the Blood now appears like the Blood of Pleuretics, with a firm

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strong Pulse; then bleeding is to be repeated, till the Breathing begins to be more free and easy, or till the Crassamentum of the Blood begins to be of a loose Texture, and to lose its sily Coat, or till the Blood comes thin, florid, and loose, and gives off but a small Quantity of Serum, after sometime standing; then we must omit Bleeding, and by other Methods endeavour to relieve the Patient.

THERE is a Train of Symptoms, which frequently happen, not only in the Beginning of this, but in the Beginning of all other inflammatory Diseases; viz. an oppressed, irregular, sluggish, and sometimes intermitting Pulse; the Patient at the same time complains of great Weakness, Oppression, and Anxiety; and oftentimes there is a Coldness of the extreme Parts: all which Symptoms seem to contra-indicate bleeding. But when we consider that this sudden Dejection of Spirits,

rits, Loss of Strength and Pulse, cannot possibly arise from a Want of sufficient Quantity of Fluids, or from their being grown already so viscid, that they cannot circulate, as the Disease has been of so short a Duration; but from too great a Quantity, which over-loads the containing Vessels, and thereby gives rise to all those Symptoms. For when the Fibres which compose the Vessels, are, by too great a Quantity of the contained Fluids, distended beyond their natural Tone, they cannot contract themselves so as to give a proper Degree of Velocity to the Fluids, to enable them to perform their Secretions, and prevent their falling into Cohesions, Viscidity, and Tendency to Stagnation. Hence soon follows an Oppression, a Dejection of Spirits, and a Coldness in the extreme Parts; for want of a due Circulation, and a proper Secretion of the Juices; which is soon followed by Death itself; except the increased Quantity

tity of the Fluids is evacuated, and the
 Equilibrium, between the containing Vef-
 sels and the contained Fluids, is again re-
 stored; which takes off the Oppression of
 the Fibres, and enables them to return to
 their former Contractions, and the mus-
 cular Canals to exert their Force, to give
 a due Degree of Velocity to the viscid and
 dense Juices, and render them more fit to
 perform their Secretions; which will soon
 invigorate the Action of the Heart, and
 of the other Vessels, and allay those vio-
 lent Symptoms: So that in these Cases
 bleeding is so far from weakening the Pa-
 tient, that it is the only Remedy left to secure
 him from Death. We have, several Times,
 been called to Persons labouring under
 all these violent Symptoms, *i. e.* Anxiety
 Oppression, on the Breast, a Coldness in
 the extreme Parts, great Weakness, some-
 times with a Coma; the Pulse scarce per-
 ceivable and intermitting; for which we

always order a large bleeding, and immediately after the Operation the Pulse hath begun to rise, the Oppression and Anxiety to abate, and a great Heat to diffuse itself all over the Body; after which the Patient is, as it were, restored from Death to Life. But to return to our subject, during the Time of bleeding, and through the whole Course of the Disease, it will be necessary for the Patient to draw in the Steams of warm Water, wherein have been boiled emollient Herbs, Roots, and Seeds, to his Lungs; his Legs and Feet should be well fomented with the same emollient Fetus, and afterward a large Veficatory should be applied to each Leg, which will be found of singular Service; his Drinks should be cooling, relaxing, and gently saponaceous, such as thin Whey, a Ptisan of Barley with Liquorice and Figs, Infusions of Pectoral Herbs and Roots. Honey boiled with Water and

Vinegar, will be found an excellent Drink in these Cases; but we should observe that all his pectoral Drinks should be gently acidulated with the Juice of Seville Oranges or Lemons. His Belly, which is generally bound, should be fomented with an emollient Foment, and a gentle laxative Clyster should be injected, to evacuate the gross Excrements and Flatulencies; but great Care must be taken not to bring on a Diarrhœa, which will always be attended with dangerous Consequences, by suppressing the Expectoration without relieving the Disease: for it will always be observed that when there is a great Flux of Humours downward, the superior Parts grow dry, the spitting ceases, and Death soon closes the Scene: So that, in these Diseases, we should be very careful not to let the Body be too costive, which will always increase the Fever, nor too loose lest it should suppress the Expectoration.

After

After bleeding and the Use of the foregoing external Medicines, a Course of the following Internals should be used to cool, dilute, and thin the remaining Mass of Fluids, and prevent an Increase of the inflammatory Lensor.

R. Sperm. Ceti (in vitel. ov. sol.) ℥j; Aq. Alex. simpl. ℥ij; Sal. Nitri ℥j; Sp. Sal. Am. gt. xxx; Oxymel. Scillit. ℥ij; Syr. Balf. ℥iij; M. f. haust. tertia quaque hora sumend. superbibend. haust. Aq. Hord. vel Decoct. Pector.

R. Ol. Amygd. dul. ℥j; vitel. ov. N^o. j; M. deinde adde Elix. Paregoric. ℥j; Aq. Pulegii ℥j; Sp. Nitri Dul. gt. lx; Diacodium ℥iij; M. f. haust. anodyn. omni nocte hora somni sumend.

THIS Draught will be found to be of great Service in allaying the Cough, and at the same time rather promotes than lessens the Quantity of the expectorated Matter. The sick Person should be kept as quiet as possible, carefully avoiding all the Passions

Passions of the Mind, and Exercises of the Body. The Air should be cold and clear, as there is an absolute Necessity, when the Lungs are inflamed or obstructed, for the sick Person to breathe a cold clear Air; but then the Steams of an emollient Fetus should be drawn in with the Breath at proper Intervals, lest the Extremities of the Pulmonary Vessels should be constricted, and the Quantity of the expectorated Matter lessened. The Patient's Drinks should be administered in small Quantities, but often repeated, and as hot as he can bear; for cold Drinks are very prejudicial in this Disease.

When the Blisters, applied to the Legs in this Disease, do ulcerate, they generally give great Relief; but great Care must be taken that the Discharge from them is not too suddenly suppressed; for very frequently after this, not only the Cough and Difficulty of Breathing will be found to

to return, but likewise a colliquative Diarrhoea, with Night Sweats, and other Symptoms of a Hectic ; which will frequently end in Death.

If, notwithstanding all our Endeavours, the Disease still increases, and the Symptoms declare an Imposthume formed in the Lungs, all possible Means must be used to break it immediately, and to make a Discharge thereof through the Windpipe ; and afterwards we must administer some such Medicines as will heal the Parts, before they can acquire any Degree of Foulness, or ulcerate. The Imposthume may be broken by, first, preparing the Body with a sufficient Quantity of soft Food, fat Broths, and oleous Medicines ; afterwards directing toward the Lungs the Steams of hot Vinegar, Wine, or Euphorbium ; causing the Patient to halloo, cough, or to be jolted in a Coach or Cart. Some such Medicines as the following will be found to be very good in these Causes.

℞ Gum. Ammon. ℥j; Aq. Pulegii ℥vj; f. solutio cui adde Oxymel. scillit. ℥ij; M. f. mistura. Capiat cochl. iij; quarta quaque hora.

DURING the Use of these Medicines, the Patient should drink freely of warm Broths, made very fat, and use gentle Exercise.

As soon as we find the Imposthume is broken, the Patient should be immediately put on a Course of Asses Milk, with a Diet of the softest vegetable Food; he should constantly use the soft Steams beforementioned, and gentle Exercise, the chief of which should be riding on Horseback, or in a Coach; and these should be continued sometime, with the Use of Medicines of the following Kind.

℞ Sal Nitri gt x; Bals. Gilead. gt. xv; Conf. Ros. Rub. q. s. M. f. Bol. ter in die sumend. superbibend. Cochl. iv. Mistura seq.

℞ Decoct. Pectorale, ℥viii; Flores Benzoin. ℥ss; Oxymel Scillit. ℥j; M.

IN

IN the second Species, or Peripneumonia notha, we must proceed in a different Manner to relieve the Patient; and not because it has the Name of Peripneumony, proceed in the Cure by repeated Bleedings, although the Load and Oppression at the Breast may be very urgent; but consider the low, weak, Pulse, the pale and crude Urine, and the Heat little above what is natural. When Blood is drawn from a Patient labouring under this Species, it has not that viscid Buff, as in the genuine Peripneumony; but it appears of a darkish livid Hue. Although, in the general, more or less Blood should be drawn in the Beginning of the Illness, to take off the Load and Distension of the Vessels, that the Medicines which are administered may act with more force, in taking off the Viscidity of the remaining Mass of Fluids: But a Repetition of this Evacuation is very dangerous. After bleeding, if the Patient
has

has any Sickness at Stomach, or urging to vomit, a gentle Emetic of the following kind, should be immediately exhibited.

*℞ Pul. Ipecacaanhæ gr. xv; Oxytel scil-
lit. ℥j; Aq. Flor. Sambuc. ℥vi; M. f. haust.
emetic.*

THIS will not only relieve the Stomach and Lungs of the viscid Matter which adheres to them, but will also, by the Concussion it gives to the whole Body, promote a general Attenuation and Fluxibility of the Mass of Fluids. But when the Pain at the Stomach and Urgings are not violent, in the Room of a Vomit, a gentle Cathartic should be exhibited; afterwards the Patient should be put under a Course of the following Kind of Medicines.

*℞ Camph. gr. iv; Bezoar. min. ℥j; Sal.
vol. succin. gt. vj; Conf. Fruet. Cynosb. q. s.
M. f. Bol. sexta quâque horâ sumend. super-
bibend. haust. seq.*

℞

R. Sperm. Ceti (in vitel. ov. sol.) ℥ss;
Sal. Nitri gr. xii; Sp. Sal. vol. Aromat.
gtt. ℥x; Aq. Alex. simpl. ℥ij; Oxymel scillit.
℥ij; M. f. haust.

BLISTERING Plaisters applied in this Species of the Disease are of singular Service, as they not only drain off a great Quantity of morbid Humours, but, by their attenuating and stimulating Quality, are of great Service in dissolving the Cohesion and Viscidity of the Fluids; three or four should be applied to the Legs and Thighs, and a very large one to the Neck: the Parts should be well rubbed before the Blisters are laid on, as it will be found to promote their rising, and consequently their Discharge. The Patient's Drinks should be of the mild, attenuating, sapo-naceous Kind; as the pectoral Decoction, Infusion of Penny-royal, Hyssop, Ground-ivy, or Elecampane, sweetned with Honey, and acidulated with Sp. Sulph. or
 Juice

Juice of Lemons. His Diet should be thin Broths, Water-Gruel, Panada, &c. If, after three or four Days, the comatose Symptoms, and a very difficult Respiration remain, notwithstanding Bleeding and a Course of the foregoing Medicines have been ordered, more Blisters should be applied, and a Course of Medicines of the following Kind entered on immediately.

R. Bezoar. Min. ℥j; Sal. vol. Succin. gr. x; Camph. gr. vj; Conf. fruc. Cynosb. q. s. M. f. bol. quanta quaque hora sumend. superbibend. haust. seq.

℞ Sal. vol. c. c. gr. x; Suc. Limon. ℥iij; M. deinde adde Aq. Alex. Simpl. ℥iss; Oxy-mel Scillit. Tinct. Croci aa ℥j; M. f. haust.

But even here, these Medicines must be increased, or decreased, in Quantity, according as the different Degrees of Heat, and Difficulty of Breathing, the State of the

the Fluids, and other concomitant Symptoms shall determine.

In the third Species which we have taken Notice of, or, if we may use the term, the Catarrhal Peripneumony, it is necessary we should begin the Cure with bleeding; to allay the inflammatory Symptoms already present, and to secure the Body from future ill Accidents. Immediately after bleeding, a large Blister should be applied to the Neck, and two to the Legs, to draw off the acrid Defluxion from the Lungs; and some emollient pectoral Pti-fan, or Mixture, should be administered, to temperate the Acrimony of the Humours, and promote Expectoration. The next Day it will be necessary to administer a gentle Cathartic, of the following kind, which should be repeated, except there is a laudable concocted Expectoration.

R Mannæ ʒvj; Juscul. avenac. ʒij; M. f. Solutio; Deinde adde Pul. Rhab. Sal.

K k

Diuretic.

Diuretic. aa. ℥j; M. f. haust. cathartic. mane cum regimine sumend.

AFTERWARDS the following Kind of Medicines should be exhibited during the Course of the Disease, increasing or decreasing the Quantity, as the Symptoms, and Strength of the Patient shall indicate.

℞ Bezoar. Min. ℥j; Conf. Ros. Rub. q. s. M. f. bol. quarta quaque hora sumend. superbibend. haust. seq.

℞ Decoct. Pectorale ℥iss; Gum. Oliban. ℥j; M. f. Solutio. deinde adde Elix. Purgoric. ℥j; Sp. Nitri Dul. gtt. l; Syr. Bals. ℥ss; M. f. haust.

IF the Cough is violent at Night, as is frequently the Case, the following pectoral Draught will be found to be inferior to no Medicine the Materia Medica furnishes us with, for allaying that Symptom.

℞ Sperm. Ceti (in q. s. mucilag. Gum. Arabic. Dissol.) ℥j; Decoct. Pectorale ℥ij; Sp. Nitri. Dul. gtt. lx; Bals. Traumatic. gtt.

gtt. l; *Diacodium* ℥j; *M. f. haust. omni nocte hora somni sumend. si tussis urgeat.*

THE Patient's Drinks, in this Species, should be Water-Gruel sweetened with Honey, and acidulated with the Juice of a Seville Orange or Lemon, pectoral Decoctions or Infusions, or Coffee, which is very much recommended by several Physicians. His Diet should be thickening Broths, Sago, &c. carefully avoiding all Kinds of Meat which stimulate, or increase the Heat and Acrimony of the Humours.

(500)

C H A P. XIV.

Of the Putrid Peripneumony.

P R O P. I.

To define the Nature and Cause of this Disease.

THE putrid Peripneumony is a Disease of a very dangerous Nature, which hath raged frequently in this and the neighbouring Kingdoms for these Thirty Years past; and, as far as we have observed, hath not been treated of by any of the physical Writers: Therefore we shall, from the Observations we have made, during our Practice, endeavour to point out its true Causes, Effects, and Method of Cure.

THIS

THIS Disease generally attacks Persons of an Ill-Habit of Body, where a Cachymy abounds; those who are scorbutic, or have been fed, for some time, on very salt or putrid Meats, or have drunk corrupt or putrid Fluids; especially seafaring Persons, and those who have been fed in Prisons or Jails; where the Air is likewise fully impregnated with a putrid Effluvia; which, being drawn into the Lungs, assists to destroy the Texture of the Blood, and make it a corrupt Mass of putrid Matter. The immediate Cause of this Disease is a Dissolution of the Blood-globules, and an Inflammation of the Lungs the Consequence thereof; for when the Texture of the Blood is dissolved, it is rendered capable of entering into all the minute Vessels of the Body, whose Diameters exceed the Diameters of the Particles of the dissolved Matter; and consequently as the Lungs are replete with

K k 3 minute

Vessels, and the whole dissolved Mass of Blood must pass through their Substance, a great Quantity of this dissolved Mass will be forced into their minute Vessels, by which Obstructions, an Inflammation will be generated; and this Disease will be the Consequence thereof.

PRO P. II.

To point out the Effects of this Disease.

IMMEDIATELY after the capillary Vessels of the Lungs begin to be obstructed with this dissolved Matter, the Patient finds himself short breasted, listless, and faint on the least Motion; but as soon as an Inflammation is generated, the foregoing Symptoms increase, with Heats and wandering Pains all over his Body, like a Rheumatism. A Fever follows with a great Load at the Breast and Anxiety; his Pulse is very quick and small, with a
dry

dry Cough, unequal Sweats, and a perpetual Restlessness; after two or three Days he begins to expectorate a thin, bloody, or very dark coloured Matter, of a very offensive smell, and very often a brown or livid Petechiæ will appear about the fifth or sixth Day; his Urine is frequently of a dark brown, or of a fiery Colour, as if mixed with Blood; is voided in small Quantities, and without any Manner of Sediment; his Tongue is black and very foul, and the Blood drawn from him is in a dissolving, putrid, State; the globular Part loose, the serous Part turbid and reddish. Immediately after the Patient is blooded, he falls into great Anxiety, Faintness, Loss of Strength, cold Sweats, and has an intermitting Pulse; although, before, his Pulse was strong and hard, and the Fever high. About the sixth or seventh Day he is generally attacked with an Hæmorrhage, or a bloody Dysentery,

Dysentery, which is soon followed with a Train of very dismal Symptoms, and, without speedy Relief, Death soon closes the Scene. This Disease, without the Assistance of Art, will always terminate in Death; therefore whatever Hopes the sick Person must have, must arise from the prudent Administration of Medicines suitable to the Nature of his Disease; which we shall treat of in the next Proposition.

P R O P. III.

To point out the Method of relieving this Disease, as far as it is within the Power of Medicine to do it, or as far as it is capable of being relieved.

THE Method of relieving a putrid Peripneumony is very different from the Method of relieving the former Species we have taken Notice of; Bleeding must now be very cautiously used, especially if the
Pulse

Pulse is low and quick, with unequal Sweats; although the Cough and Load at the Breast seem to indicate it: but when, in the Beginning of the Disease, the Pulse is strong and throbbing, and the Fever runs very high, bleeding is very necessary; and afterward the Patient should be put on a Course of Medicines of the following kind: because if we bleed a second Time in this Disease, Death must be the Consequence.

℞ *Bezoar. Min. ʒss; Conf. Ros. Rub. q. s. M. f. bol. quarta quaque hora sumend. superbibend. haust. seq.*

℞ *Decoct. Cort. Peruv. ʒij; Gum. Oliban. ʒj; M. f. solutio. Deinde adde Sal. Natri ʒj; Syr. e Limon. ʒss; M.*

MANY Physicians would be very cautious in giving any Preparation of the *Cortex Peruv.* in this Disease, because of the Oppression at the Breast, and beginning Inflammation of the Lungs, and would, in its Place, order some emollient Medicines

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R Decoct. Cort. Peruv. ʒij; Gum. Oliban. ʒj; M. f. solutio. Deinde adde Sal. Natri ʒj; Syr. e Limon. ʒss; M.

MANY Physicians would be very cautious in giving any Preparation of the *Cortex Peruv.* in this Disease, because of the Oppression at the Breast, and beginning Inflammation of the Lungs, and would, in its Place, order some emollient Medicines

times to relax the Vessels, and promote Expectoration; but these Physicians must give us leave to observe, that that Method is prejudicial in the Beginning of the Disease, and indeed throughout its whole Course, except cautiously used; for (laying aside Experience) let us but only consider, that this Inflammation is generated by a dissolved State of the Blood, and consequently whatever dissolves the Blood yet more, or relaxes the Vessels, so as to enlarge their Diameters, will increase the Inflammation; which a Quantity of emollient Medicines are known to do; and, on the other hand, whatever strengthens the Texture of the Mass of Fluids, must decrease the Inflammation, by rendering them incapable of entering into these minute Vessels; which Preparations of the *Cortex Peruv.* are known to do; and as the Preparation I have ordered in these Cases, is guarded with Diaphoretics and

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Diuretics,

Diuretics, it cannot possibly produce any ill Effects, but, on the contrary, will be found to be the best Medicine the Materia Medica furnishes us with; by strengthening the Texture of the Mass of Fluids, which now tends to a State of Dissolution and Putrefaction. During the Use of these Medicines we generally order the following pectoral Medicine to be drunk warm, to promote Expectoration when deficient.

R Decoct. Pectorale ℥j; Succ. Limon. ʒiſs; Tinct. Rosar, Oxymel scillit. aa. ʒij; M. capiat cochl. iv. omni hora.

VERY often the Cough rages with great Violence at Night, which is very prejudicial to the Patient; to allay which Symptom we generally order *Elix. Paregoric. ʒj vel ʒiſs* to be taken in a Draught of the pectoral Decoction. All the Patient's Drinks should be warm, as they are much better for promoting Expectoration. Wine
and

and Water acidulated with the Juice of Seville Oranges or Lemons, will here be found a good Drink: sometimes it will be found necessary to add *Oxymel Scilliticum* to this Drink, to pump up the Matter, especially when the Difficulty of Breathing, and great Rattling in the Windpipe, pronounces a great Quantity of it in the Lungs. The Patient's Diet should be Jellies, Sago, thick Gruels, &c. and all these mixed with the Juice of Lemons and Wine. Red-Port Wine mulled up with Cinnamon or Mace, and well acidulated with the Juice of Oranges or Lemons, with a Toast, will be found very beneficial in this Disease.

BLISTERING and Purging in this Case are very prejudicial, the former being frequently attended with an Ulceration or Mortification of the Part, and the latter always succeeded with a Dysentery or an obstinate Diarrhoea. About the eighth

Day

Day, sometimes sooner, we may expect a Crisis; but it will be generally an imperfect one, or a Translation of the morbid Matter on some other Part of the Body. When it is perfect, the Disease generally goes off with a large foetid Sweat, or a great Quantity of thick turbid Urine. At this time, we must use our utmost Endeavours to relieve Nature, by strong Pectorals, Corroboratives, Diaphoretics, and Diuretics. In this State we generally omit the foregoing Medicines and administer some of the following Kind.

R. Bezoar min. ℥ss; Coccinel gr. iv; Pul. Contrayervæ Com. ℥j; Conf. Ros. Rub. q. s. M. f. bol. quarta quaque hora sumend. superbibend. haust. seq.

R. Decoct. Cort. Peruv. ℥ij; Sal. Succin. ℥j; Syr. è Limon. ℥ss; M. f. haust.

AFTER this Disease has performed its Crisis, it will be necessary to order two or three Purges of Rhubarb, or some other gentle

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gentle Cathartic, to carry off the putrid Matter, which has been thrown on the Intestines; afterwards the Patient should immediately go under a Course of Asses Milk, and the *Cortex Peruv.* with gentle Exercise, especially Horse-Riding, and this in a fine Country Air; otherwise he will be in great Danger of a Consumption which very frequently follows this Disease.

FINIS.

M.DCC.LX.